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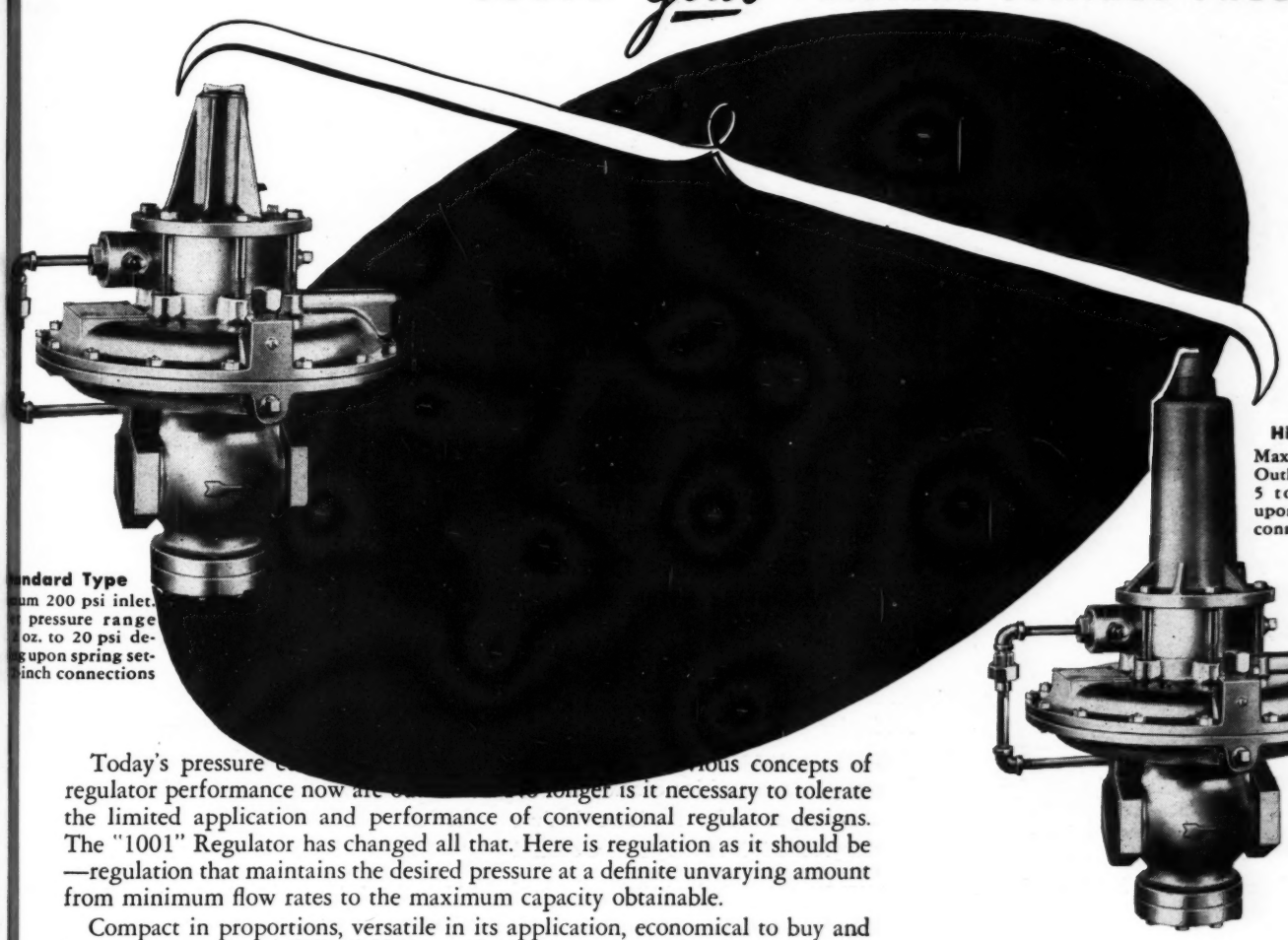

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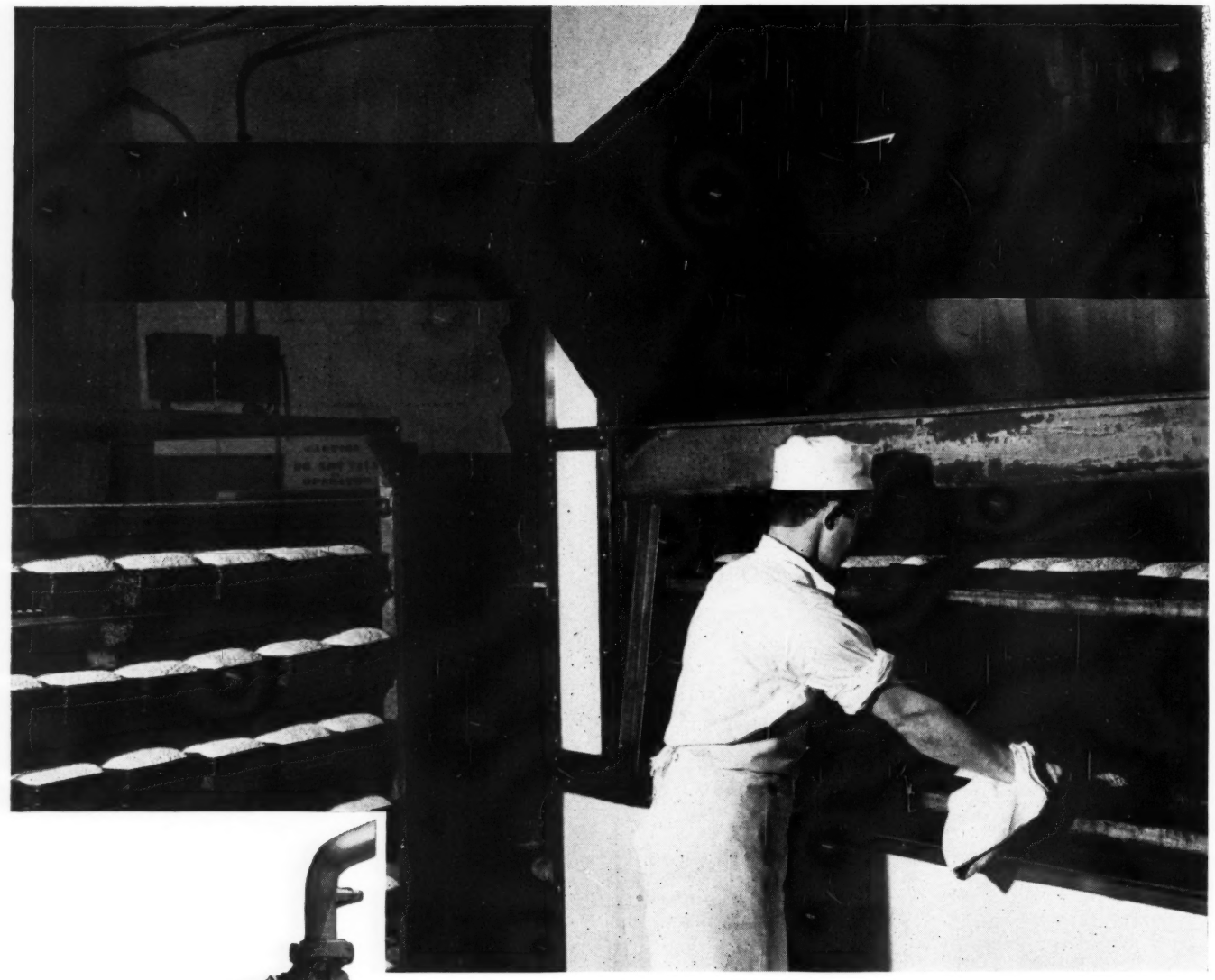

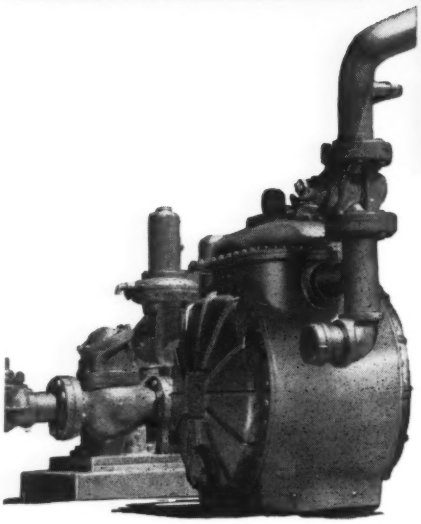

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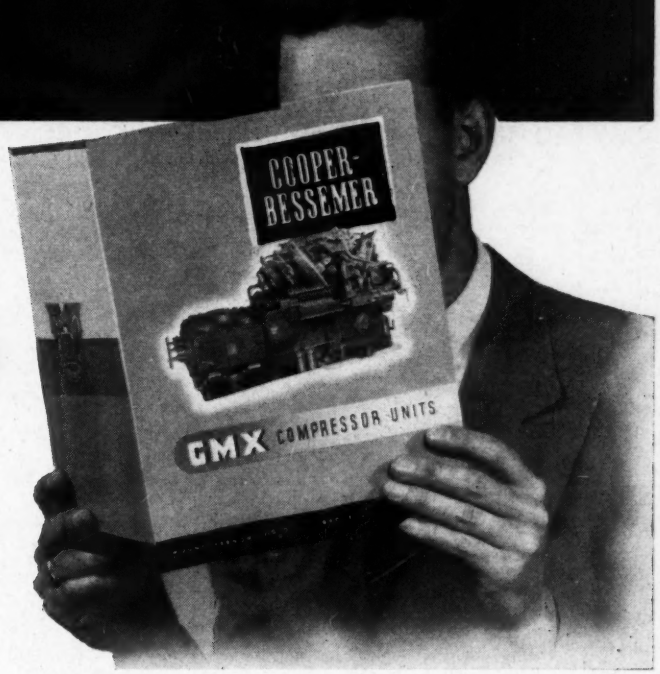

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Twenty-Second Year of Publication

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Publication Office

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Branch Offices

DAVID CARMEN, Manager, **CHICAGO 3,** 1064 Peoples Gas Building, WABash 2589

L. V. HOHL, Manager, **NEW YORK 17,** 50 E. 42nd Street, MUrray Hill 2-4504

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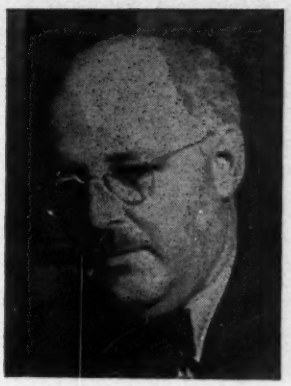
THERMALLY THINKING

By ELLIOTT TAYLOR, Editorial Director



Common Ground

A NEW and novel note was injected into the first week of the Federal Power Commission's Washington hearings in its Docket G-580 Natural Gas Investigation when former commission attorney Samuel H. Crosby, now counsel for E. Holley Poe and Associates, took the stand as a witness sponsored by the Natural Gas Industry Committee.

As the natural gas hearings have ground along since September of last year the commission has, no doubt, become more than a little case hardened to criticism of both its aspirations and its actions in respect to natural gas regulation. It has heard itself damned for what it presumably proposes to do, no less than for what it patently is trying to do. It has been warned against encroachment on states' rights in spite of its repeated asseverations that no such encroachment was contemplated. It has been figuratively tarred and feathered by the very gas producing states whose welfare it has ostensibly sought to safeguard. Its solicitude for natural gas consumers has been brushed aside with noisy scorn by those users who had been invited to seek shelter under its maternal federal wing.

Aside from the professional gas obstructionists, a dubious crew of admirers at the best, it has seen itself unloved, unwept, unhonored and unsung. The hearings which were launched with such ambitious, even though slightly confused, enthusiasm have deteriorated into a parade of objectors to the whole proceedings,—objectors who have appeared only to reject categorically and in the main any proffered protection that the commission might plan to extend them.

Against this background, unappreciative and suspicious, how warming to the collective commission heart must have been the testimony of one of its old time legal lights, Judge Crosby, who came not to castigate and condemn, but rather to commiserate and counsel with the commission, and to advise in simple terms the path it might best pursue if it would emerge from the administrative jungle into which it has wandered.

As an example of the self-imposed burdens under which the federal agency labors, this witness pointed first to the docket record and commission files in the New York State Natural Gas Corp. proceedings. Here a pipe line company merely wanted to bring natural gas across the state of Pennsylvania to supply old New York markets. The commission acceded to the request, but set up an end-use limitation in which it limited deliveries to companies under existing contracts. This case Judge Crosby viewed as the entering wedge whereby the whole Pandora's box of end-use problems has been let loose on the hapless commission. He tactfully refrained from mentioning, although he could have done so were he of the mind, that this was one of the responsibilities that the Congress had tried to spare the FPC, by refusing in 1942 to give it jurisdiction over direct sales from interstate pipe lines.

Then the witness went on to show the high price in time and manpower the commission has to pay for its paternal indulgence of the coal-railroad-labor intervenors who now appear to thwart and block and confuse almost every certificate case that comes up for hearing. The records on five recent cases were cited, in every one of which the applicant sought only to increase facilities to serve the expanding needs of existing markets. A total of 111 hearing days were consumed and 16,193 pages of testimony were transcribed of which 4602 were chargeable to coal, labor and railroad intervenors.

By comparison, the new $70 million line from Texas to California was concluded in twelve days of hearings and with only 1700 pages of transcript. But that was made possible only because the natural gas obstructionists, the coal-railroad-labor coalition, magnanimously refrained from opposing the project.

Citing as his authority the Natural Gas Act, the witness drew the conclusion that "having ample statutory authority, the commission may tighten up its procedures dealing with interventions" and, "It would seem reasonable for the commission to require that one proposing to intervene set forth in his application . . . the facts on which he relies to establish his right to intervene as a 'competitor' . . . or 'in the public interest.'"

The commission's case load was surveyed and Chairman Old's testimony before the Senate Appropriations subcommittee recalled, in which he listed 102 applications for certificates of public convenience and necessity pending as of Jan. 31, 1946.

The conclusions drawn and presented by Mr. Crosby on behalf of the Natural Gas Industry Committee may well be considered of a nature designed to be beneficial to the natural gas companies. But in view of the manifest inability of the Federal Power Commission to cope with the administrative load which it has heaped upon its own shoulders, these conclusions could and should be looked

upon by the commission as a practical and reasonable avenue of honorable egress from its present administrative morass.

The recommendations made by the industry committee, the first categorical and specific statement of the united industry position with respect to the administration of the Natural Gas Act, are worth reproducing in full:

The Natural Gas Industry Committee, believing these matters to be of paramount importance in efficient service to the public and for fair and business-like administration of the Natural Gas Act, respectfully recommends and urges that the commission promptly:

1. Determine the service areas of natural gas companies pursuant to the provisions of Section 7(f) of the Natural Gas Act. Those companies having no direct competition with any other natural gas company may be released from most of the certificate procedure quickly and inexpensively. Companies in competitive areas will cooperate with the commission to expedite such determination.

2. The commission's rules and hearings practices governing interventions should be amended and revised to confine coal-railroad-labor participants closely to *actual* competitors "of a party to such a proceeding, or whose participation in the proceedings may be in the *public* interest." It is patent from current records of hearings in certificate cases that the commission now freely grants the privilege of intervention to numerous persons and associations having no possible status as competitors, or in the public interest.

3. Simplify certificate procedure, pending determination of service areas, and require members of the commission's staff to confine hearing tactics and "deficiency letter" requests to data relevant and essential to the particular application.

4. Immediately conform the commission's procedure to the new Administrative Procedure Act in matters of hearings and ajudication so that trial examiners may at once exercise their enlarged responsibility and authority in the conduct of hearings to enable them to expedite procedure and exclude exploratory, repetitious and irrelevant evidence.

As the investigation draws to a close, we believe the members of the Federal Power Commission must be acutely aware of the fact that what is universally desired of them, and for them, even by their well wishers, is not further extension of their authority, either by new laws or by devious interpretation of existing law, but rather a more efficient and effective administration of the responsibilities imposed on them by laws already in existence.

And should they at some future date, perhaps even as a result of the Docket G-580 investigations, conclude that amendments to the existing statutes are in order, what could testify better to their ability to undertake new responsibilities than a record of efficient and impartial administration of the old ones.

At all points where the natural gas industry and the Federal Power Commission are both honestly dedicated to the public service there exists and can be found common ground for cooperative action in the public interest.

A Good Omen

THE appointment of the new National Petroleum Council, an industry committee created to serve in an advisory capacity to Secretary of the Interior Julius A. Krug and his recently organized Oil and Gas Division conforms to a pattern that we believe the natural gas industry has learned to understand and can continue to trust. For while the National Petroleum Council is new, and the Oil and Gas Division of the Department of the Interior is but a mere fledgling in the governmental nest, there is about them both an unmistakable aura of the Petroleum Industry War Council and the unparalleled government and industry accord that that wartime emergency creation fostered.

The fact that former Deputy Petroleum Administrator Ralph K. Davies was called in by Secretary Krug to assist in selecting the members of the council and launching the program of the Oil and Gas Division is in itself an indication of the integrity of purpose that stands behind the new creation. Many of the 85 oil and gas men called to serve were at one time members of the PIWC under Davies.

Secretary Krug, through his wartime position as director of the Office of War Utilities, became a personage both well and favorably known to the gas utility industry. In simple and understandable terms, he was regarded as a government official who could be trusted for his integrity, his impartiality and his essential fairness, even under circumstances where these desirable characteristics were sometimes given scant consideration.

The National Petroleum Council will have no trouble locating problems affecting both the oil and gas business that will require speedy attention. The question of the disposal of the War Emergency Pipelines—a political football that is all but lost in the shuffle as it is being kicked around in Washington—is one that can be given consideration at any time, and the sooner the better. The oil industry in the main wants to see the lines turned over to the transmission of natural gas, and a number of natural gas bidders have indicated their willingness to buy the lines for that purpose if they can be guaranteed the right to use them. The coal lobby has effectively blocked natural gas out of the Eastern seaboard. It is time for a united oil and gas industry to face that reactionary opposition with a united front of determination and political acumen.

The problem of end-use of natural gas, on the surface a matter of concern largely to the pipe line companies, is of vital importance to every producing company where oil occurs in association with gas. Here again the same opposition stands in the way of the fullest utilization in the most profitable markets, of the incidental gas production that oil production brings about.

Perhaps it is not the Secretary's plan to push his new Petroleum Industry Council into the thick of these and other controversial problems until it has had a few preliminary bouts with such matters as oil and gas statistics and other routine problems of an interstate nature. But sooner or later it will have to tangle with the champion contenders who now lay claim to the right to dictate the fuel policies of the nation.

We believe that the Council just appointed will come out of its corner fighting when the bell rings. And with Krug in, the fight won't be rigged.

New ideas and developments in the technical aspects of the gas industry are discussed in a new editorial comment feature—"Technical Trends," by Guy Corfield, technical editor of GAS—appearing for the first time in this issue. Mr. Corfield's comments, carried on Page 63, will be a regular feature of this magazine.

Highlights

• Gas appliance manufacturers have plenty to grumble about but apparently they are determined to speak in unison as an industry. At the annual GAMA meeting held in Chicago last month, manufacturers who produced more than 90% of all the gas appliances and equipment to go on the market were represented. Managing Director Leigh Whitelaw reported that the association's membership has increased 40% during his two years in office.

• Top interest witness in the final hearings of the FPC natural gas probe the week of June 17 proved to be P. C. Keith, genius behind the new Hydrocol process to make gasoline from natural gas. When a coal lobby cross examiner asked him why the first plant was using natural gas instead of coal to manufacture synthetic gasoline, Keith replied, "Because it was impossible to get the coal people to put up either research or gamble money."

• A letter from A. Stockstrom, president of the American Stove Co., breaks the bad news to Magic Chef dealers that "conditions instead of improving are likely to become worse . . . our employees are on the job satisfied with their wages . . . we have more men, more manufacturing space, more machinery than before the war. But because of the lack of steel some of our plants will probably have to close next month (June). American industry is a complicated thing. We are only a small part of that big machine. We can operate only when the entire machine operates". And every manufacturer in the United States could honestly admit the same thing.

• The tentative schedules for the balance of the FPC Washington hearings include: The week of July 1, Tom McGrath's presentation of the coal industry's case, which is expected to draw between 10-15 witnesses; July 8, more McGrath followed by the California Railroad Commission. The summation and presentation of the industry's case is expected to start about July 17, with 14 witnesses scheduled to appear. It is believed that direct and cross examination of all the natural gas witnesses will carry the hearings beyond the first of August.

• Interior Secretary J. A. Krug has announced the names of 85 men asked to serve on the Interior Department's new Oil and Gas Division (OGD). "The purpose of establishing the Natural Petroleum Council is to continue the government industry teamwork that proved so important a factor in the success of the war program," Krug said. Seven council members represent the natural gas industry: Burt R. Bay, president, Northern Natural Gas Co.; Stewart Crocker, president, Columbia Gas and Electric Co.; Leroy Edwards, president, Southern California Gas Co.; D. A. Hulcy, president, Lone Star Gas Co.; Frank Lerch, president, Consolidated Natural Gas Co.; N. C. McGowen, president, United Gas Pipe Line Co.; W. G. Maguire, Panhandle Eastern Pipe Line Co.

• The FPC has authorized Panhandle Eastern Pipe Line Co. to construct and operate additions to its main gas transmission system extending from Texas to Michigan. Estimated cost is $6,216,000. Designed pipe line capacity will be increased from 383 MMcf to approximately 393 MMcf daily.

• Possibly to forestall latent bureaucratic ambitions, Senator Joseph C. O'Mahoney of the Special Petroleum Resources Investigating Committee interrogated OGD Acting Director Ralph K. Davies as follows: "Do I correctly interpret these documents to mean: 1) That the war controls have been definitely ended; 2) That there is no purpose to set up any form of peacetime control over the petroleum industry; 3) That it is the object of the Administration to coordinate the executive functions of the federal government; and 4) That in doing so you are seeking to bring about the appointment of an advisory council in order that there may be understanding and cooperation between the executive arm of the government and the industry —all of this being based upon a recognition of the fact that the policy determining branch of the government still is the Congress of the United States?" Mr. Davies' reply: "Senator, that expresses our purposes accurately and I think completely."

• "You want to know what the potential demand is for (liquefied petroleum gas) appliances. . . . Let me recite a few figures and you draw your own conclusions. Four years elapsed during wartime conditions when the expansion of the industry was practically at a stand-still. During that time the demand certainly was as great if not greater than existed in 1941 when 500,000 new users were installed. Four elapsed years times 500,000 new users per year is two million users that would have been added during that period. Therefore, there must be two million homes today that do not have liquefied petroleum gas that would have had it had we sent a salesman to see them. In addition there must be two-thirds to three-fourths of the 20 million homes beyond the city mains that economically are in a position to acquire the service."

K. W. Rugh, Phillips Petroleum Co., speaking before the GAMA convention, Chicago, June 11-12.

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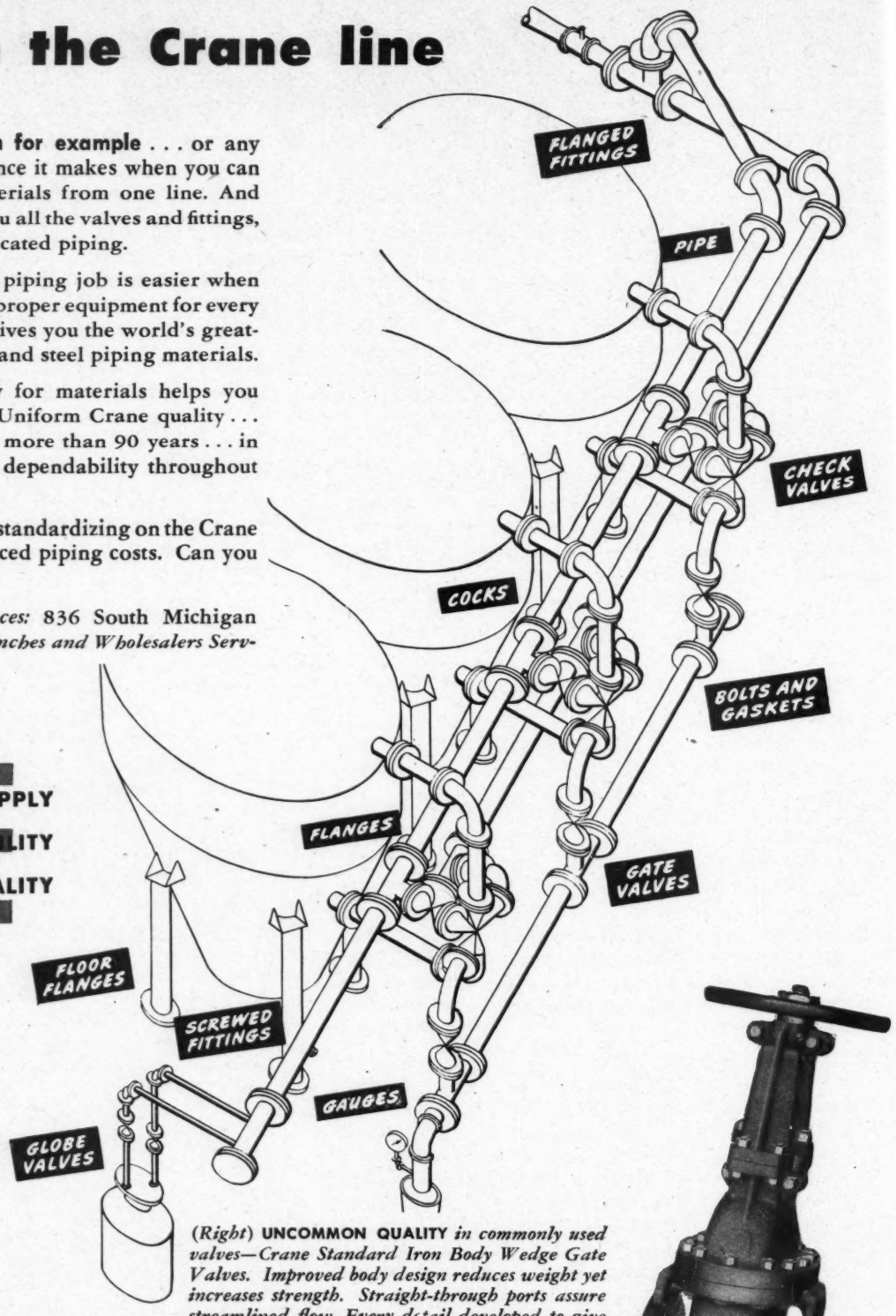

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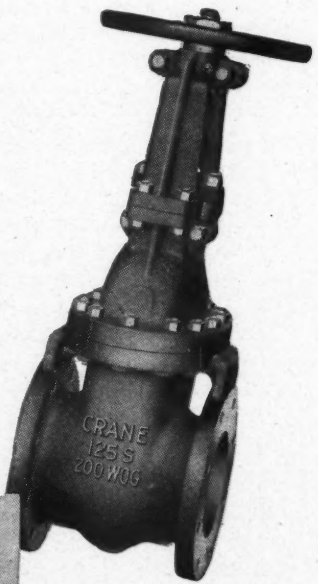

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ACCENT ON RESEARCH

Growth of Coordinated Program Basis of Industry's Future

By ELLIOTT TAYLOR

Editorial Director, GAS

LONG a subject of concern to gas industry executives has been what the utility branch of the industry regarded as a dangerous lack of fundamental research in matters affecting gas production, transmission and utilization. Even prior to the war they were already expressing this concern, and as the gaudy announcements of the new dream world products of the electrical competition grew to be accepted miracles in the public imagination and anticipation, it became increasingly apparent that some industry-wide action on behalf of gas was required.

Even more distressing, perhaps, was the dawning realization on the part of gas utility bigwigs that financial institutions were beginning to write the manufactured gas side of the industry off as a declining asset from an investment standpoint.

At the annual meeting of the American Gas Association in New York, held in the fall of 1944, Ernest R. Acker, who was then president of the association, clinched his arguments in behalf of the immediate necessity for an expanded program of research and promotion by quoting from a current issue of "Moody's Bond Survey" in which the long term prospects of the manufactured gas industry were termed "unimpressive," with a "likelihood of further gradual deterioration." Quoting from this widely circulated investors guide, President Acker horrified complacent executives by reading:

"The inability to show recovery (after the depression) in succeeding years is attributed to the fact that the industry did not develop new uses for its product nor stimulate wider usage by existing customers, particularly domestic."

A concluding observation was to the effect that "the process of deterioration (postwar) may again be resumed because the basic factors responsible for that experience are likely to become operative once again under peacetime conditions."

It has since been recognized that the spectre of the financial doghouse was the most potent argument of all in persuading recalcitrant executives to pledge their financial support to a three-year program there proposed. The program of combined research, promotion and expanded advertising at a cost of $1 million a year for a three-year period was soon underwritten.

It would be patently unfair to assume that the gas industry was a stranger to research prior to the stimulation of interest brought about by the contemplation of postwar conditions. Projects of a fundamental nature looking to the betterment of the fuel, to its more efficient utilization and wider distribution had been carried on for years under various loosely related auspices.

As early as 1923, and off and on until 1927, experiments in coal carbonization had been supported to some extent at Ohio State University, and in cooperation with the U. S. Bureau of Mines. The technical section of the A.G.A., which nursed these projects along, also gathered data and assisted companies in making studies in gum deposits in meters and piping.

The testing laboratories of the A.G.A. were set up in Cleveland in 1925, first to test appliances for adherence to certain minimum standards of safety and performance, and later to embark on problems of actual research. The first research job was started in 1927, when an investigation into the fundamental characteristics of mixed gas was launched as a five-year project.

NGA Merger with A.G.A.

In 1927, when the Natural Gas Association merged with the A.G.A. it brought along into the literature of the united industry some studies and investigations in problems of high pressure gas transmission. These were largely compilations of experiences reported by member companies, and data on gas well deliveries studied in connection with the Bureau of Mines.

In the same year the first industrial gas research was launched as a laboratory project, sponsored by Charles A. Monroe—another five-year plan that has been going on more or less continuously since that day. Studies were to be made in the fundamentals affecting metals that are processed by heat; in burner noise elimination and in the preheating of primary air for combustion.

By the fall of 1933 F. C. Weber, a vice president of the Brooklyn Union Gas Co., was able to sum up the accomplishments by proudly stating, at an annual convention in Chicago; "You will probably be impressed to learn that during the *past decade* there has been expended through the agency of the A.G.A. and with the support of its members, over three quarters of a million dollars on the research program . . ."

That three quarters of a million, spent over a full decade before 1933, was allocated to a program for which $600,000 is now being spent every year.

In 1941 the Institute of Gas Technology was created to provide a center for graduate education and research in gas industry problems. Under the sponsorship of subscribing utilities and manufacturers of gas equipment, it has been working ever since its inception on sponsored projects of general interest to the industry, as well as on specific assignments for individual companies.

Appliance Men Indifferent

Manufacturers of gas appliances, particularly in the field of domestic equipment, however, had been for the most part lukewarm to any industry-inspired and underwritten investigation in the field of utilization. Inveighing against what they termed "applied" as distinguished from "fundamental" research, they preferred to carry on their own investigations, each maker looking to the immediate improvement of his own particular product.

Particularly were many apprehensive lest the program be allowed to fall completely under the domination and control of the A.G.A. testing laboratories. And while their relations with the gas utilities dictated against open and avowed opposition

to an industry research program, many remained covertly indifferent or opposed to any scheme having cooperative connotations. They wanted, in short, product research with immediate findings that could be patented and incorporated in their various lines of merchandise. Such investigations, they contended, could be developed only under strict control, and in a reasonable atmosphere of secrecy. It is noteworthy that this feeling on the part of the manufacturers has been largely dissipated, and at a recent meeting (1946) at the Cleveland laboratories of the association, 110 manufacturers of appliances had top-flight production and design men in attendance to hear the reports on new developments then being investigated. All were present, it is reasonable to assume, in search of new ideas that might be taken back and incorporated into their own output. It was at this same meeting that the new viewpoint of manufacturers was expressed by Lyle C. Harvey, president of the Gas Appliance Manufacturers Association, when he said: "The development of the domestic gas research program during the past few years leads me to the certain conclusion that we have struck a proper balance between collective association research and individual development efforts of manufacturers."

Applied Research

Appliance and equipment concerns specializing in gas furnaces, burners and special adaptations of gas to large scale industrial processes have for many years been active in applied commercial and industrial research. It is largely through their early efforts that many of the new techniques, now almost commonplace, were developed. But here again there has always been an understandable preoccupation with the gas-burning equipment eventually to be placed on the market. And research that strayed far from the goal of saleable apparatus has naturally been somewhat scant.

Thus, while research was by no means a novelty or an unknown quantity in the industry, it was not until the appointment early in 1944 of a coordinating committee on research, within the ranks of the A.G.A., that all of these diversified and only roughly parallel activities began to shape up as a complete and integrated entity, recognizable as the start of a comprehensive research program.

The steps by which the program was brought into the form of a proposal to the industry, the intensive efforts on the part of top utility executives whereby it was implemented financially, and the speed with which it was launched, did much to brighten the dim and lugubrious view of the industry's alertness that prevailed in some financial circles.

Funds were available for use by March 1, 1945, and in the seven months between then and the end of the association's fiscal year in October, $210,396 had been spent, with $743,373 estimated as the authorization for the fiscal year 1946. Although the present program is part of only a three-year plan, contemplating the expenditure of $600,000 a year on research, it is apparent that a new pattern of industry investigation into the fundamentals of its product and its utilization has been established. And, as most leaders have now come to agree, that pattern presages the continuous financing of adequate research, through funds collected for that specific purpose, over an indefinite future period.

The present program may be divided into three distinct parts, distinguished by their sponsorship and objectives: 1) gas production research, 2) gas utilization research and 3) general technical research in gas and related fields.

Gas production research, of greatest interest to the manufactured and mixed gas companies and financed largely by their contributions, is concerned chiefly with the problem of developing new methods (or improving old ones) whereby manufactured gas may be improved in quality and produced at lower cost. The rise in income levels in the Eastern manufactured gas areas, and the increase in popularity of the fuel have led to an unprecedented demand for gas house heating. But increased house heating involves heavy peak loads that many existing gas plants are unable to supply without adding new gas-making facilities.

Production Research

Lower investment cost processes for producing peak load gas are therefore of immediate interest and concern to most of the manufactured gas companies. Research toward this end falls into two general classifications: 1) that designed to refine and improve existing gas manufacturing processes and, 2) inquiry into new fields of hydrocarbon reactions for the cheaper production of manufactured gas. Two projects under the first classification cover a study of the oxygen-carbon-steam and the steam-carbon reactions. At the Institute of Gas Technology a small project covers a study of these reactions on a laboratory scale at various temperatures and at pressures up to 300 psi. A somewhat similar project at the Battelle Memorial Institute is directed to the study of the water gas reaction at atmospheric pressure.

Plant tests on the grounds at various manufactured gas works have brought about an exchange of recommendations between companies that have resulted in increased capacities being obtained with existing equipment.

Another activity of interest to the manufactured gas industry, as making for lower production costs, is that of developing processes that will provide increased yields of saleable by-products incident to gas manufacture. At Pennsylvania State College a project for the upgrading of the quality and consequently of the value of by-product tar is being undertaken.

Investigation into new fields of hydrocarbon reactions includes the study of catalytic gasification of butane, propane and the catalytic reforming of natural gas. The importance of these projects lies in their ultimate goal of adding flexibility to manufactured gas operations by enabling coal and water gas makers to add reformed hydro-carbon gases to their output without materially changing the physical characteristics of the gas served.

Flash pulverization of coal and coke, and the study of the gasification of the resulting powdered fuel, constitute a combination project looking toward possible new processes of commercial gas manufacturing.

Several other projects are at present only in the stage of reviewing and cataloging the existing literature. Processes and proposed investigations here may or may not indicate desirable fields for further experimental research.

Utilization

Gas utilization research is primarily directed toward improvements in appliances and methods of burning gas. These projects may be grouped under two main categories: domestic gas research and commercial and industrial utilization research.

The domestic gas research projects now embrace 22 assignments, most of which have been given to the A.G.A. testing laboratories. Many of these investigations have to do with possible improvements in the design of gas ranges, water heaters, other appliances or their component parts. To a large extent they are either supplementary or parallel to like investigations being carried on under the auspices of the many individual appliance manufacturers.

Other projects of an exploratory nature more recently undertaken are avowedly aimed at developing an understanding of problems associated with, but not technically a part of, domestic utilization of gas.

Three interrelated fields in this classification are those of kitchen ventilation, home humidity control and the venting of room heaters. The A.G.A. laboratory has already issued a bulletin on kitchen ventilating, and home humidity control and the study of venting room heaters are being studied under an assignment given to the Purdue Research Foundation.

Two Other Studies

Of a more or less visionary nature at present are two other studies; one is a research into gas burners, and the other a search for new methods of application of gas to cooking. In the former, attempts are being made to design a commercially feasible gas burner in which all of the air for combustion is injected as primary air. The search for new gas cooking applications is an exploratory assignment without limitations other than those of its own definition. Its aim is to find out if there can be discovered any completely new and better way to use gas in the preparation of food.

To bring all of these domestic gas research findings to the appliance manufacturers as they are developed, periodic technical conferences on domestic gas research are held. At these meetings all of the work under way, and the findings whether they be final or only tentative, are presented to the engineers and designers who are responsible for their translation into new appliance refinements.

Commercial and industrial gas utilization research is in the main a continuation of the work in these fields that has been under way continuously for years in the research departments of the various makers of gas-fired equipment for industry. Leaders in this activity have been the Surface Combustion Corp. and the Selas Corp. of America. Lately the A.G.A. laboratories have been working on the development of a plug-in automatic connection for gas appliances. This is to correlate and supplement the commercial attempts that have been made in the past to perfect such a device.

General technical research is something of a catch-all into which fall various projects involving the cooperation of other industries and other agencies aside from the gas industry. Research on the interchangeability of various high heating value gases with natural gas falls in this category. It is another project that aims primarily at helping the manufactured gas industry solve its peak load problem.

Natural gas hydrates in pipe lines is being studied in cooperation with the U. S. Bureau of Mines. Controlling and gauging combination oil and gas wells is another Bureau of Mines project in which the production side of the natural gas industry has a lively interest and is continuing the cooperation initiated during the war.

Pipe coatings and corrosion is an assignment of the U. S. Bureau of Standards, but one on which the natural gas pipe line companies have long since developed an extensive fund of technical and practical knowledge.

While much of the organized research into matters affecting the gas industry has been brought within the range of A.G.A. interest, and supported where necessary by its assignments and appropriations, there are constantly going on investigations and studies outside the specific scope of the utility industry's program.

Mention has already been made of the independent efforts of the manufacturers of appliances and equipment in the domestic, commercial and industrial fields. Understandably, developments that are aimed at improvements in manufacturers' models are not publicized until they have reached the stage of patents applied for. The first formal notice of many innovations and improvements in the past has been contained in the printed literature describing new products available for sale.

Many of the fundamental inquiries into the development and production of synthetic fuels touch on such gas-related matters as coal hydrogenization, gas synthesis and the recovery of liquids from oil shales. Thirty million dollars of public funds has been appropriated to the Bureau of Mines for expenditure over a five-year period on this program alone.

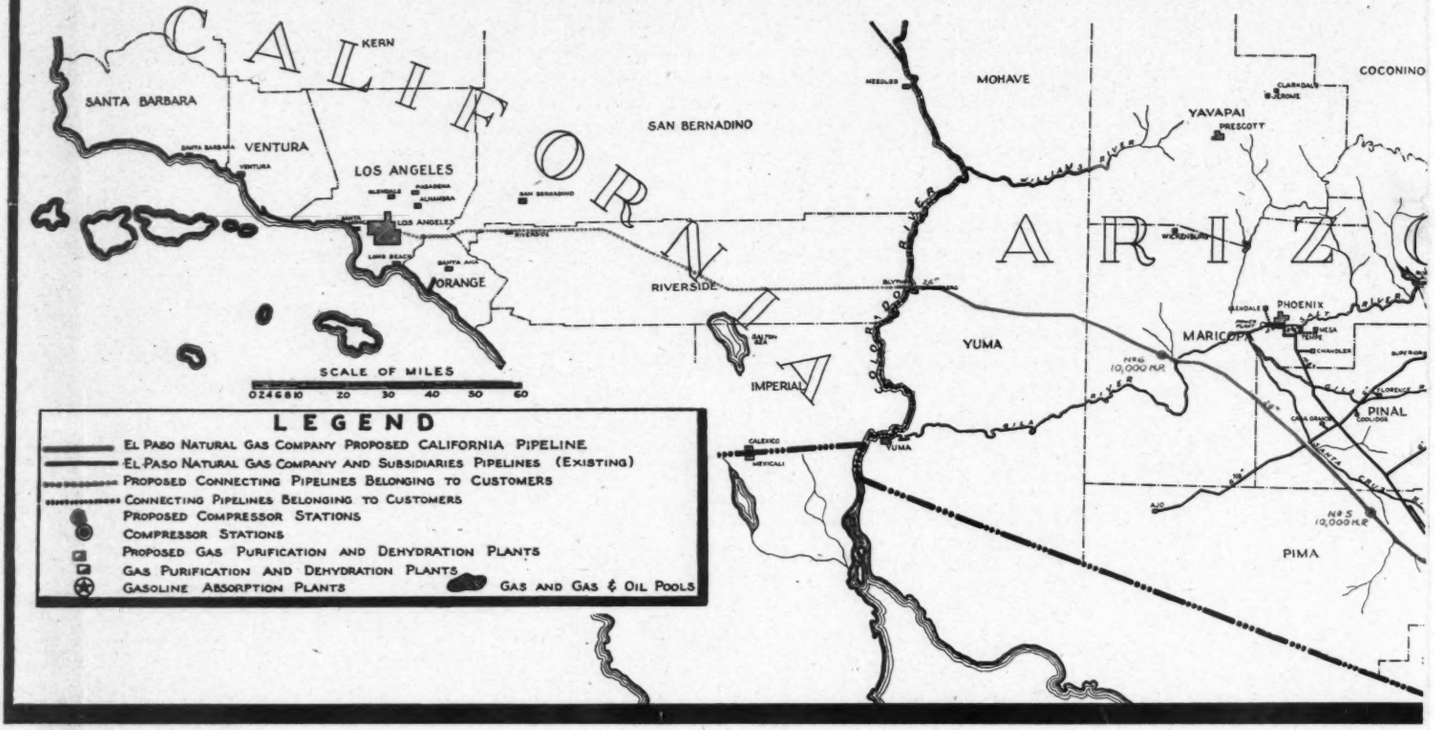
Much research has been conducted in recent years in the non-fuel uses of natural gas. The new developments in hydrocarbon chemistry and its relation to the new and expanding plastics industry may be of great significance in dictating the future value of natural gas, as well as in deciding the area of the country in which it will be in greatest demand.

Natural gas producers are interested in any process that will make their product more valuable, and thus enable them to demand a better price for it in the field. As these developments materialize, when and if they do, the gas utilities, who are large purchasers of natural gas for resale, must of necessity be prepared to offer methods and equipment that will make for the most efficient and economical use of the fuel that may one day cost them much more per Mcf.

For this reason, if for no other, and for its companion implication that the very existence of the gas utility industry may one day hang on developments that are now only subjects of laboratory and field studies, the industry knows that its research program is here to stay. It knows that there can be no turning back on the task that it has wisely imposed upon itself. And it knows that in future years the question of appropriations for research will not be one of how little can be appropriated, but rather one of how much more can be effectively spent.

H. F. Rehfeldt, The Peoples Gas Light and Coke Co., Chicago, new chairman of the Midwest Industrial Gas Council, (second from right), receives gavel from Vance Uhlmeyer, Iowa-Illinois Gas & Electric Co., Chicago, retiring chairman. Other newly elected officers are Paul F. Gibson (left), Western United Gas & Electric Co., Aurora, Ill., secretary-treasurer; and G. W. Hathway (right), Central Illinois Light Co., Peoria, Ill., vice chairman.

FPC APPROVES TEXAS-TO-



THE 1280-mile, $70 million Texas-to-California pipe line will become a reality in 1947. The Federal Power Commission in its Opinion 134 last month announced approval of the system, which had been on its docket since last November.

Although proposed chiefly as a means of bolstering Southern California reserves, which were heavily taxed during the war because of increased population and the demands of war industries, and the need of more fuel in the armed services, the lines will serve the additional purpose of utilizing large amounts of oil well gas now being wasted at the Permian Basin field. It is estimated that 75% of the maximum requirements of 305 MMcf will be supplied from this one source, with the remainder coming from the Panhandle and Hugoton fields' dry gas supply.

The importance of the project was underlined by the Federal Power Commission in its report, which revealed that gas far outstrips its competition in supplying the space heating, water water heating, and cooking load for the area.

Principals in the pipe line negotiations are the El Paso Natural Gas Co. of Texas and the Southern California Gas Co. and Southern Counties Gas Co., the latter two to be joint recipients of the gas which the El Paso company will furnish. At a cost of about $16.2 million, the Southern California concerns will construct 214 miles of 30-in. connecting pipe line extending from Blythe, Calif. at the Arizona border, to Santa Fe Springs, near Los Angeles. The largest pipe line ever built, it will carry 52 MMcf every day of line pack storage in addition to the rated delivery capacity of 305 MMcf. A 10,000 hp. compressor station will be built near Blythe as part of the installation.

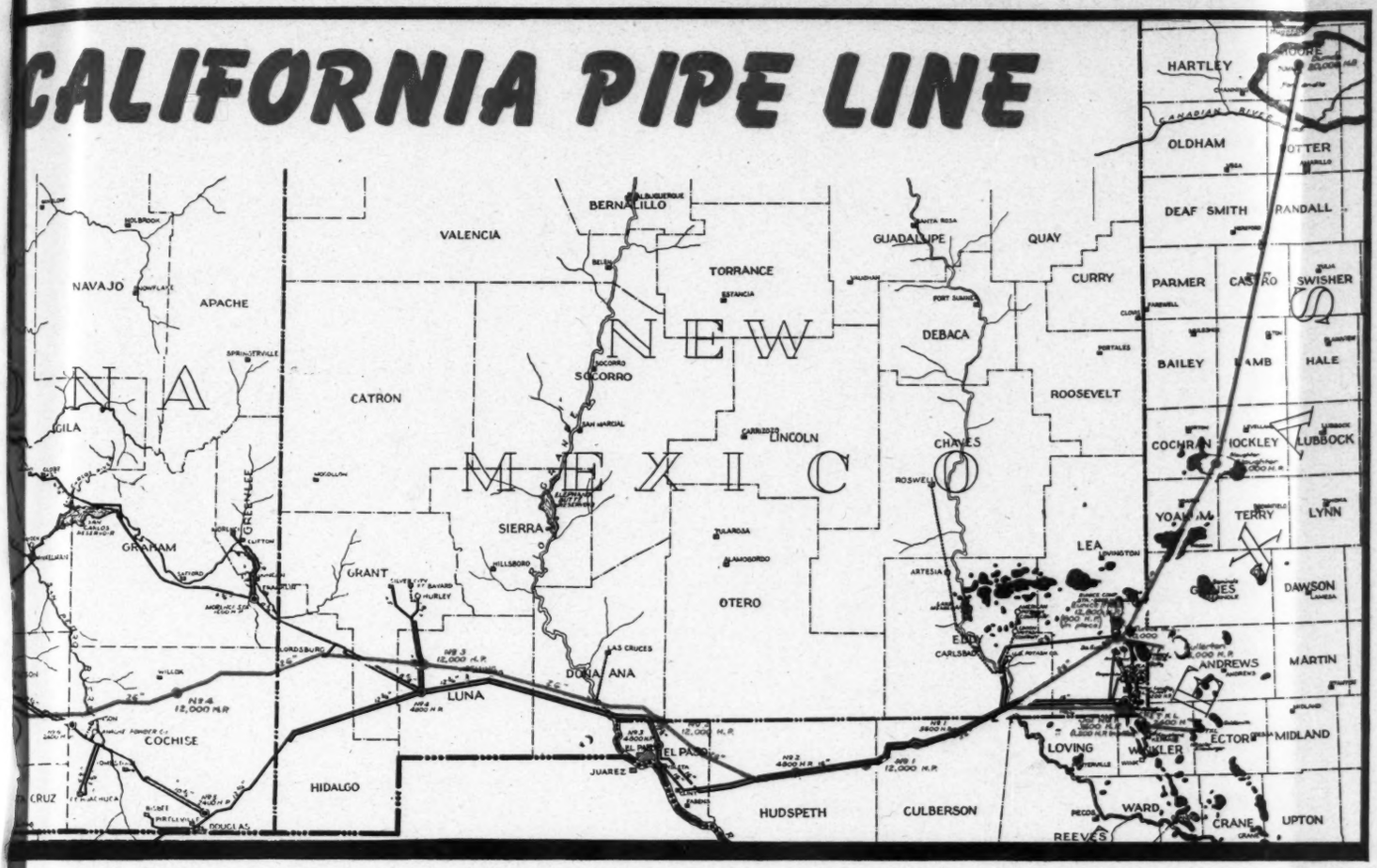
El Paso Line

El Paso's share of the line, which will ultimately represent an outlay of $53.8 million, will include 737 miles of 26-in. pipe extending from Eunice, in Lea County, Texas, to the California border; a 251-mile extension of 24-in. transmission pipe line from Dumas, Texas, to the Eunice plant in New Mexico; compressor stations with an aggregate of 129,800 hp; five connecting lateral lines in the Permian Basin in New Mexico and Texas; three gas purification and dehydration plants and one gas dehydration plant, and other facilities. The reason for the larger diameter pipe in California is the need for line storage there.

With contract commitments to the California companies running for 30 years, El Paso has entered into compacts with four suppliers in the fields. Phillips Petroleum has agreed to furnish up to 225 MMcf per day from the Permian Basin, Hugoton, and Panhandle fields, for a period of 30 years. Gulf Oil and Shell, on a 20-year basis, have signed for a maximum of 20 MMcf each; and Warren Petroleum Corp. will supply 10 MMcf of Permian gas on a 15-year basis.

Unique in FPC hearings was the lack of opposition to the scheme. In this particular case, all interested parties were aware of the pressing need for the pipe line. In its report, FPC said:

"The companies own no natural gas production property and are dependent mainly upon oil well gas instead of dry gas for their local source of supply. As the oil producers are primarily interested in oil production, the gas companies must adapt their operations to the rate and volume of oil production to utilize the producers' surplus oil well gas. Lately the oil companies have undertaken major pressure maintenance and repressuring projects to increase the future oil recoveries, thus withholding large vol-



umes of gas from California utilities. Such gas may not be available to the California companies for from 15 to 25 years."

Although California's known reserves, as of a year ago, were 11,825 trillion cu. ft., the geographic location of the fields is such that the dry gas reserves, except for the minor fields and underground storage, are not normally tributary to the Southern California market.

To supplement the gas supply assured under the terms of the four contracts it has made, the El Paso company is negotiating for additional volumes of gas from that now being vented in the Permian Basin, along the route of the line.

Deliveries to the California companies will be made on a sliding scale, with 24 MMcf per day scheduled for the first year—beginning in June, 1947—175 MMcf the second year, and 305 MMcf, the capacity load, by the beginning of the third year.

Satisfied that the additional withdrawals from the southwestern fields would not impair future service to present customers, the commission stated:

"The evidence on gas reserves available to the proposed pipe line from the Panhandle, Hugoton, and Permian Basin sources is comprehensive. There is expert opinion evidence that Phillips will be able to supply El Paso with gas from the west portion of the Panhandle Field and from the southern portion of the Hugoton field in Texas at the rate of 190 MMcf a day for 30 years."

Financing

Financing of the project will be aided by the sale of bonds, distribution of common and preferred stock, and bank loans. The El Paso Natural Gas Co. has arranged to sell $36 million of 3% 20-year first mortgage bonds; will borrow an additional $8.5 million from the Chase National Bank, at 2% interest; will distribute through underwriters $7.5 million of 4% to 4½% preferred stock, and will sell $4 million of common stock to present holders at $40 a share.

Southern Counties and Southern California Gas will jointly borrow $10 million from banks, and will meet the remainder of the outlay from current funds. They will pay 15 cents per Mcf the first year, 14½ cents the succeeding three, 14 cents thereafter.

In summing up its approval of the case, FPC said:

"This case is distinguishable from others which have been considered by the commission involving mid-western and eastern nautral gas pipe line companies. Applicant El Paso by means of its proposed pipe line project will utilize, as its major source of supply, oil well gas from the Permian Basin which otherwise would be wasted. Moreover, the record shows that no other natural gas pipe line company is proposing to utilize such gas or to serve the proposed market.

Only One Market

"The proposed project will serve only one market of any consequence in contiguous areas of Southern California and lacks the sometimes conflicting interests present in major certificate proceedings before the commission. In addition, the record contains evidence of the available natural gas reserves and deliverability for the ultimate delivery capacity of the proposed pipe line for 30 years.

"The evidence shows that the prospects for discovering within California the necessary large volumes of gas which must be made available to the California applicants within the next few years are not encouraging. The California applicants are confronted, therefore, with a rapidly declining supply of local gas and an increasing customer demand for gas."

IT WILL PAY TO CONVERT

By H. EMERSON THOMAS and PAUL E. PEACOCK, Jr.

IN the past few years many operators have given much thought to converting their manufactured gas properties to liquefied petroleum. To many of these operators, and especially the smaller ones, conversion to liquefied petroleum will be an economic necessity. Because of this manifest interest in conversions, recent trade papers have been filled with articles on that subject.

Much credit is due some of the authors in the preparation of their articles, and these have aided greatly in formulating conversion plans. However, many of the articles lack any practical application and some of these have tended to confuse and upset owners interested in conversion. In several cases, the articles were apparently based entirely on theoretical and slide rule types of conversion, being "paper conversions" only and containing no basis for the deductions presented.

Because of the great interest of the authors in liquefied petroleum and since they are actually engaged in design, conversions and plant operations, it was their desire to give a practical analysis of conversions that prompted this article.

The first thing an operator considers when thinking of converting is what he will gain economically from the change. Economic advantages are of two types, the direct and the indirect. The direct advantages are, of course, the actual economies realized in production costs, commonly termed "holder costs." The indirect economies are those to be realized in savings in other departments, such as those resulting from the use of a cleaner, more uniform gas. Other indirect economies are in items such as insurance, accounting and tax savings.

In addition to the actual economic advantages of a conversion, there will be realized another benefit in the form of greatly improved customer relations. The latter will eventually become an economic advantage, because it would result in increased use of the gas by present consumers as well as the addition of new customers.

Although we are first interested in the actual economic advantages to be realized immediately, we should not overlook the long range advantages offered by conversion to liquefied petroleum gas. A few of these indirect advantages will be discussed in conjunction with actual economic benefits to be received.

Analysis of Production Costs

A typical survey by the authors will be used for presenting production costs with manufactured gas as compared with estimated costs for the same plant with propane-air gas. The particular property surveyed is a carbureted water gas plant of 1900 meters sending out 53,592 Mcf of gas annually. This send-out and manufactured gas costs are taken from actual company records. The comparison by accounts is shown in Table 1.

The various accounts will be familiar to manufactured gas plant operators and, while they may vary slightly from some plants, the total will be quite comparable. Since we are interested mainly in the *total* production costs, a detailed analysis of each account will not be made.

Labor

As will be noticed in the analysis of this plant, as in manufactured gas plant operation generally, labor comprises approximately one-fourth the total production costs. Since our income is controlled by regulatory bodies, it has been a hard fight to hold plant personnel and still not have to pay them such high wages as to upset the entire operational balance. Even though most plants have already raised wages 20%, 30%, or even higher, we have no assurance of what the morrow will bring. With the present trend we are sure to have the production labor costs raised another 20% or more in the future.

No operator should have to be reminded of the constant worry he has gone through for several years and is still going through because of the uncertain labor situation, aggravated by government policies and employees' unrest.

When you convert to a liquefied petroleum gas plant you remove this constant threat of labor unrest, rising rates of pay and associated worries. A properly designed liquefied petroleum plant, being 100% automatic in operation, requires only a minimum of labor and this could be supplied in emergencies by the property manager himself if necessary. All that is required is a regular checking of the automatic controls to determine that they are operating properly, and the maintaining of the LP-Gas inventory. The total production labor in a well designed plant would normally average less than an hour a day.

Fuels and Other Costs

Next in importance to the large labor costs in a manufactured gas plant are items of fuel. We all know of the several increases we have had in coal and oil prices in the past year and there will be more yet to come. Unsettled labor and other conditions have made it impossible to buy coal on a firm price contract and any price stated in the contract can be changed overnight. Under these conditions, we haven't the slightest idea what our fuel costs will be next year, or even next month. These costs, like labor, comprise a large share of the total production costs and, when subject to change as they are, offer a serious threat to the company's financial structure.

Under liquefied petroleum comparative costs, you will note that cost of the liquid is almost the entire production cost. Quite unlike the fuel for a manufactured gas plant, it is possible to secure a long term liquid propane contract with a firm price stipulation. In the future, all indications are that you can rest assured keen competition for this liquid business will keep the prices in line.

The holder operating costs have been shown for both types of gas, even though in many converted plants it will be possible to eliminate the holder and save this additional amount. Under propane-air, there is also shown an amount for vaporizing the liquid for gas making. In warmer climates and with medium or small properties, the cost can usually be eliminated by proper design of the plant. All of the other charges with manufactured gas plant operation will be eliminated after converting to liquefied petroleum, except the nominal water cost.

TO PROPANE-AIR

You will here note the very sharp contrast between the production costs for the two types of gas. With the manufactured gas plant, the total cost per thousand is 62.7 cents. As compared with this cost, you will note the low cost of 39.8 cents per thousand with propane-air. This propane-air cost will vary according to freight rates for different localities, but it reflects the immense saving to be realized in most properties. This factor alone should convince the most skeptical property owner of the economic superiority of liquefied petroleum gas.

In addition to the above economies, notice the sharp contrast of maintenance costs. Boiler plant equipment and water gas generating equipment will be entirely eliminated with propane-air, thus cutting out a tremendous maintenance cost. The maintenance to buildings and also that to storage facilities is shown to be the same with both types of gas; but here, also, we would save the holder maintenance costs should the holder be eliminated, as would be the case in many conversions.

With propane-air the usual maintenance will consist of nothing more than a few gaskets, diaphragms, some packing and oil from time to time. With a majority of plants the maintenance would be negligible and all told it should not exceed the amount shown. This fact is one of the outstanding advantages of liquefied petroleum gas and should be given due consideration when one is thinking of converting.

Many manufactured gas plants use the total of production and maintenance as the "holder costs" of the gas. Under this plan, then, you will note that the "holder costs" would be 66.7 cents per thousand with manufactured gas as compared with 39.9 cents for the propane-air gas.

Distribution Expenses Chargeable to Production Methods

We have covered the accounts normally included in production: however, in many properties cost of compressing high pressure gas is charged to distribution when it is actually a production process.

In the property being analyzed, as in many others, the compressing is done by steam and an estimated amount is charged against distribution expenses for operation of the steam compressor. Of course, it is not known what the actual compressing costs are with the usual steam compressor, so no fair comparison can be made on this individual account. While the compressing cost under manufactured gas is only an estimate, this charge under propane-air has been figured from compressor efficiencies and existing electric rates and is fairly accurate. Also, under manufactured gas operations, only about one-third of the send-out gas is compressed, while the propane-air compressing cost is based on compressing all gas should this be necessary or advisable.

Furthermore, a very large part of customer appliance adjustment complaints are due to impurities in the manufactured gas and the constant variation in the Btu; thus, most of the "Consumers Premises Expense" should be charged back against manufactured gas production costs. Appliance adjustments and similar complaints will drop to a minimum with propane-air, but only one-half of the present annual consumers premises expense has been charged against manufactured gas production in the analysis. The additional savings to be realized in distribution accounts by not having to pump drips, clear plugged lines and similar work has not been included in these considerations even though this saving will be a material one.

Total Manufactured Costs

The total *actual* cost of the gas as attributed to production methods is shown for manufactured gas as being 72.2 cents. This high cost is to be compared with 45.8 cents with propane-air, which gives an annual saving for this particular property amounting to $14,128.83. This annual saving will go a long way toward paying for the conversion and future savings can be used to improve the financial structure of the property.

While this discussion has been limited to normal operation and maintenance charges, propane-air has a very decided advantage in other ways. With propane-air (or other liquefied petroleum plants), enlargement of plant capacity, after the initial installation, requires only a small outlay of additional capital. In many plants, the capacity could be doubled for only a few hundred dollars.

With manufactured gas plants any improvement or expansion project will run into thousands of dollars. Addition of a simple back-run to an existing water gas set would cost $7500 to $10,000—or more—while the installation of a new set to replace one that is worn out or too small would run

SIXTEEN YEARS' experience in the field of liquefied petroleum gas and its application to the gas manufactured field have convinced the authors of the economy of converting manufactured gas systems to liquefied petroleum, and have qualified them as authorities on the subject. Of particular interest to many companies contemplating making the change is the relative independence of labor needs, a factor particularly timely in view of present labor unrest. Savings, the authors have determined, may be effected in production operation, distribution, and maintenance.

P. E. Peacock

H. E. Thomas

Mr. Thomas is an LP-Gas consultant, with offices at Westfield, N.J. Educated at the University of Illinois, Oklahoma university, and Oklahoma City university, in 1929 he joined the Philgas department of Phillips Petroleum Co., handling wholesale utility and industrial sales and operations, and regulatory contacts. He left Phillips before the war to open his own office in Westfield. In 1944, he became part owner and operator of a group of utility companies and liquefied petroleum distributing companies.

A charter member of the National Bottled Gas Association, he served as its president for two terms. He also served on the committee of gases of the National Fire Protection Association, and has been actively working with the Interstate Commerce Commission, Bureau of Explosives, and other organizations and committees.

Mr. Peacock, who is manager of the Martinsburg (W.Va.) Gas and Heating Co., was engaged in the engineering of the butane-air gas systems at Pulaski and Radford, Va., in 1931. Later, he designed a plant and installations for three cities in Maryland. He has designed over a dozen butane-air gas plants and systems, and has been active in the conversion of numerous water gas systems to natural gas, as well as water gas or coal gas to propane. Currently he is engineering the Portland, Maine, 2-MMcf-daily propane-air, peak shaving installation, and several other projects.

TABLE 1. COMPARISON OF GAS PRODUCTION COSTS
53,592 Mcf Annual Send-Out

*Present Carbureted Water Gas Costs**		*Corresponding Propane-Air Costs**	
Boiler Plant and Other Labor	$ 2,477.22		None
Water Gas Generating Labor	3,714.54		None
Purification Labor	351.76		None
Misc. Production Labor	1,276.64	(estimated at $1 per day)	$ 365.00
Boiler Fuel	5,164.04	(for vaporizing liquid propane)	226.16
Water	348.76	(estimated at $5 monthly)	60.00
Water Gas Generating Fuel	8,986.05		None
Oil for Water Gas	9,401.00		None
Propane Liquid	None	(292,250 gallons at 7c)	20,457.50
Purification Supplies	390.26		None
Misc. Works Expense	910.08		None
Residuals Expense	45.00		None
Operation of Storage Facilities	556.32	(only if holder is retained)	250.00**
Production Operating Totals	$33,621.67		$21,858.66
Cost per MCF	62.7c		39.8c
PRODUCTION MAINTENANCE CHARGES			
Structures and Improvements	$ 124.40		124.40
Boiler Plant Equipment	575.46		None
Water Gas Generating Equipment	1,214.84		None
Other Production Equipment	129.70	(estimated at $25 monthly)	300.00
Storage Facilities	100.00	(only if holder is retained)	100.00
Production Maintenance Totals	$ 2,144.40		$ 524.40
Cost per MCF	4.0c		0.1c
Total Production Account Charges	$35,766.07		$21,883.06
Cost per MCF	66.7c		39.9c
DISTRIBUTION EXPENSES WHICH MAY BE CHARGED DIRECTLY TO GAS PRODUCTION PRACTICE AND METHOD			
Operation of Compressor	$ 2,098.80	(electric costs at 5c per MCF)	$ 2,679.60***
Half of Consumers Premise Expense	826.72		None
Total Distribution Charges	$ 2,925.52		$ 2,679.60
Grand Total Production Costs	$38,691.59		$24,562.66
Cost per MCF	72.2c		45.8c
ANNUAL DOLLAR SAVINGS REALIZED BY CONVERTING TO PROPANE-AIR GAS			$14,128.93

*Approximate Btu-output figures: Water gas, 525; propane-air, 600-760.
**Operation of Storage Facilities reduced due to not having to pump holder drips daily.
***See "Distribution Expenses Chargeable to Production Methods."

up to perhaps $50,000 or more depending upon the size of the set. Replacement or improvement of other plant equipment is similarly priced. All of this additional capital outlay would have to be considered from the investment, depreciation and rate making angles, not to mention interest on any money borrowed for the purpose.

Is Conversion Practical?

After considering the economic advantages of converting a manufactured gas plant to liquefied petroleum, owners are faced with the question: "Is it practical to convert?" In this connection, no property owner need fear the conversion of a manufactured gas system to liquefied petroleum if the conversion is planned and conducted with capable engineering assistance.

Converting a system might be compared to driving an automobile. With an experienced driver the car runs in the directed course without danger. However, to place a person under the steering wheel who has never before driven an automobile is an act of folly and will likely wind up in disaster. The same is true of a conversion—it must be planned and supervised by experienced, practical engineers. As with driving an automobile, it takes more than just theory—it takes actual practical experience.

Gas systems are somewhat like human beings and will vary about as much. No doctor could prescribe one medicine that would solve all the ills any human might contract and a sensible doctor would not attempt it. Likewise, no sensible engineer would prescribe one type of conversion for every gas system. Yet there are some engineers who do prescribe one type of conversion and also one type of equipment. Personal prejudices have brought about most of the difficulties encountered after conversion where a type of equipment had been installed which was not at all suited for the particular job. This is too often the case when a property owner attempts to take advantage of "free" engineering and later finds the engineer was more interested in securing the order or a gas contract than he was in giving good engineering service.

Conversions will fall under two basic types of gas, undiluted propane and propane-air. Since so many new and varied uses have been developed for butane, this liquid is not now generally recommended as a gas fuel for conversions and for this reason will be left out of these discussions.

Undiluted Propane

Conversion to undiluted propane is very definitely more desirable than propane-air in those systems adapted to this type of gas. However, not all systems can be converted to this gas economically from an operational standpoint.

With undiluted propane, the plant will consist of nothing more than a liquid storage tank, an unloading compressor, possibly a vaporizer and regulators for reducing the natural propane pressure to the desired distribution pressure. With this type of plant, no dependence will be placed on labor

or on electrical supply for operation. The normal pressure of the propane is such that all pressure needed is constantly available and has only to be regulated by reduction to the lower distribution pressure.

The initial investment for an undiluted propane plant installation is considerably less because no gas mixing equipment is required. Furthermore, to increase the plant capacity in the future all that is required is additional low priced pressure regulators or additional storage capacity.

Converting a distribution system to undiluted propane is considerably more costly than with propane-air and this tends to offset the advantage gained over propane-air by having a less expensive plant. When converting to undiluted propane it is necessary to adapt every burner in the system to the higher Btu or propane vapor which is approximately 2530 to 2550. This higher Btu is the one deterring factor to consider before converting to this type of gas. With the high Btu any leakage will be almost five times as costly as with the usual propane-air gas. Although an increased cost will be noticed with any leakage of undiluted propane, lack of production costs for mixing and compressing will offset this cost in most systems.

Sectionalizing a distribution system for conversion to undiluted propane was covered in an article last summer* by one of the authors of this article and this phase will not be covered again here.

Only by a practical survey and study of a system can it be determined accurately whether conversion to undiluted propane is feasible. However, a general rule would limit this gas to fairly new systems, compact systems, or systems with a good leakage control record over a period of years. It is obvious that a very old system is not a good system for undiluted propane because of the constant replacement of sections of worn out mains and services. No matter how diligent the operator, if the lines are like sieves, he could not hope to win an unaccounted for battle with undiluted propane. With a widely scattered system, the ratio of miles of mains to the number of customers is high and it is also hard to keep the unaccounted for down to a reasonable figure based on send-out and sales. With all this, though, no serious fear need arise when undiluted propane is considered. Good engineering will determine whether your system should be converted to undiluted propane.

TABLE 2. ESTIMATED EQUIPMENT INVESTMENT REQUIRED to Convert Water Gas Plant with up to 2000 Consumers

1 30,000-gal. W.C. ASME storage Tank	$ 5,000	1 Compressor Foundation	50
1 Set Tank Accessories	250	1 Compressor Electrical Connection	200
1 Set Tank Fittings and Pipe	200	Gas Mixing Units	2,000
1 Tank Ladder and Platform	100	Gas Mixing Unit Piping	500
2 Tank Foundations	450	Freight on Equipment	300
Tank Freight (varies with distance)	300	General Piping	700
Tank Rigging (varies)	400	Building Revisions	1,000
Tank Painting	100	Labor	1,000
1 Tank Car Unloading Compressor	700	Miscellaneous	1,000
		TOTAL	$14,250

Propane-Air

Many variations of this type of gas will be noted over the country, with most of the variations dependent upon an individual's personal deduction and theories. Conversions to propane-air will vary in Btu from around 500 up to over 1600 with little practical reason given for most of the variations. In one recent conversion it was first planned by a theoretical engineer to convert the property to 1040 Btu. Upon questioning it was admitted that this Btu was selected only because it was double the manufactured gas Btu and would simplify rate adjustments.

The authors have done much work on converting systems over to a true exchange gas. This true exchange theory was first developed on the premise that there is a very definite relation between the Btu and specific gravity of a given gas and that of any other gas. If this delicate balance is maintained, an exchange can be made between most gases without readjustment of the burners. Some exceptions will be found to this, however, with gas refrigerator burners and some poorly designed range burners. Under the true exchange gas method of conversion, the Btu of the propane-air has to be raised only enough above that of the manufactured gas to account for the higher specific gravity. The usual propane-air exchange gas will run from 635 Btu up to approximately 750 Btu depending upon the Btu and specific gravity of the manufactured gas.

Conversion to a true exchange gas has been made by the authors in a number of properties with excellent results. With the true exchange gas, practically no appliance adjustment work was necessary and this greatly reduced the cost of the conversion. In the properties converted, few customers complained of reduced heat or lower pressure, although some theoretical engineers would have you believe this complaint would be common. In fact, in two of the systems converted, the distribution pressure was lowered and the customers still had good pressure. Typical customer remarks were, "I have never had such good pressure before," or "The old gas was never this hot." These and similar complimentary remarks were the general reactions of customers following the conversions.

In some systems with long distribution lines, there may be a small loss in main capacity due to the higher specific gravity of the propane-air, but this is mostly overcome by the small increase in the Btu and is rendered non-objectionable by the more uniform and cleaner gas which permits better burner adjustment. In one of the systems converted, it was necessary, before conversion, to run a booster all day to boost the pressure from the 6 in. holder pressure up to 8 in. After conversion, the booster was eliminated and the lowest pressure recorded at any point at any time was 4.3 in.

The individual property will determine which type or types of mixing equipment will be best suited for a given plant. The types are varied and most of them have some advantages under given conditions. However, as mentioned earlier, no one type can be used economically for all properties.

The types of mixing equipment will fall into two general classifications: the inspirator type of mixer, which requires little or no power to operate and obtains its operating energy from the natural propane vapor pressure; and the compressor-mixer type. There will be found several variations of each of the above general classifications.

The inspirator type of mixer will decrease plant operating costs because it requires no electrical energy. How-

*"Do You Plan to Convert to LP-Gas" by Paul E. Peacock, Jr. GAS AGE, July 12, 1945, Part 1, P. 32, Aug. 9, 1945, Part 2, P. 37.
AMERICAN GAS JOURNAL, Aug., 1945, Complete, P. 27.
A.G.A. MONTHLY, July-Aug., 1945, Part 1, P. 315. Sept., 1945, Part 2, P. 395.

ever, with this type of mixer it is advisable to retain the low pressure holder when mixing into a low pressure system and to have an equalizing or surge tank will even out Btu fluctuamedium pressure system. The holder or surge tank will even out Btu fluctuations which are general with this type of equipment on starting up of the equipment. The more frequently the unit starts and stops, the greater will be the fluctuation in the Btu.

The compressor-mixer type of unit may be secured in either the medium pressure (2 to 3 lb.) or the high pressure classes. Where no high pressure is required, it is more economical to operate the two or three pound unit either into the low pressure holder or a medium pressure distribution system. With the medium pressure compressor type, if the operation is to be into a distribution system of similar pressure, it is advisable to have a high pressure storage tank as reserve against periods of power failure and also as a means of supplying the system during the low send-out periods when it would not be economical to operate the mixer steadily.

The most expensive type of mixer is the high pressure compressor with a proportioning valve arrangement on the suction or inlet line to the compressor. This type of plant not only has a much higher power cost per Mcf for mixing the gas but also has a higher maintenance cost. Where the distribution pressure is not too high for the medium pressure mixer it would be advisable to have a combination of the high pressure and medium pressure mixers, with the medium pressure mixer furnishing a mixing medium for the compressor gas.

In several properties converted by the authors, a combination of two or more types of mixing equipment has been installed with a reduction gained in operating costs as well as some safety against power failure and similar troubles which might render one type of equipment inoperative for a period. The slight increase in the initial plant cost is compensated for by reduced operating costs and the margin of safety gained by having extra types of mixing equipment.

Table 2 sets out an estimate of an average conversion installation to cover a plant to serve up to about 2000 customers. The investment would vary from plant to plant, based on varying conditions; thus the figures given should not be termed conclusive for any particular job. The actual investment would depend upon type of mixer equipment used. In some cases, it would be lower than the estimate and in others more. The propane storage capacity of 25,000 net gals. would be equivalent to approximately 4200 Mcf of average city gas.

The authors have attempted to give a practical analysis of the general conversion matter, with emphasis being placed upon the economic advantage to be realized. As pointed out earlier in the article, no conversion should prove troublesome if conducted by experienced, practical engineers who are interested in the *best* conversion rather than in selling a piece of equipment or obtaining a contract.

Gas Does Four Big Jobs in Pittsburgh's New "GI Dream Home"

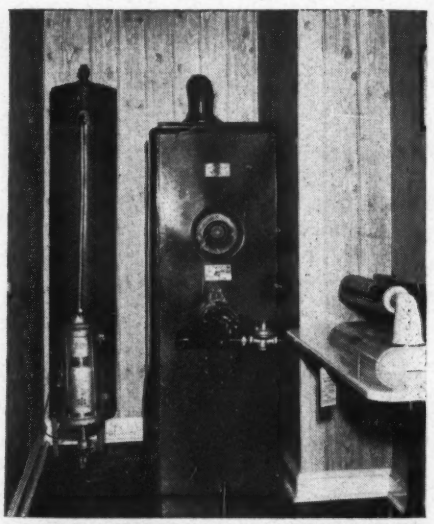
GAS has been selected to do the four big jobs—cooking, refrigerating, water heating, and house heating—in the "GI Dream Home" and in a second model house now on display in Pittsburgh, Pa. The Equitable Gas Co. is cooperating with two Pittsburgh firms in showing the homes.

The New Freedom Gas Kitchen is incorporated in the "Dream Home," featuring a Servel refrigerator and a Norge gas range. In the utility room are the automatic gas water heater and gas-fired winter air conditioner.

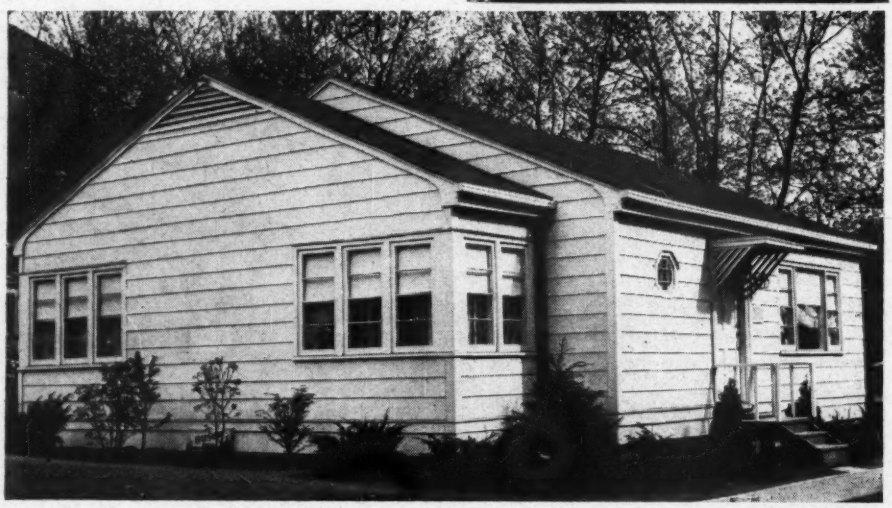
From the builder's standpoint, the five-room "Dream Home" is of particular interest in that it combines prefabrication with conventional design. Foundation, roof, and ceiling are of conventional construction, while exterior walls, inner partitions, and the flooring are shop-assembled. At present, orders for the home, which is planned to cost between $7000 and $8500 with full basement and garage included, are being accepted from veterans only.

A maximum heat loss standard has been set for the house. Annual fuel costs for such structures within the Pittsburgh area are estimated at $65. The overall dimensions of the house are 28x34 ft.

The smaller home, also consisting of five rooms but measuring 16x32 ft., was originally priced to sell for $3750, including a gas water heater, a gas-fired air conditioner, and an automatic washer. Yearly gas fuel costs are estimated at $45. The vertical, gas-fired winter air conditioner and the gas water heater occupy a floor space of only 22 in. each.



Shown at right are the gas air-conditioning system and the gas water heater, which require a minimum of space in the utility room of the "Dream Home," thus permitting almost exclusive use of the room for laundry operations. BELOW is a general view of the home, located at University Place in the Oakland section of Pittsburgh.



Trends in Processing
GAS CONDENSATE RESERVOIRS

By FRANK H. DOTTERWEICH and E. O. BENNETT

DISCOVERY over the period of the past ten years of areas in which the hydrocarbons exist entirely in the vapor phase in the formation, but which when produced will partially condense upon reduction in temperature or pressure, has focused attention upon the economics of recovering gas condensates. Research and experimentation in processing gas condensate reservoirs, including methods used by the Bureau of Mines, is reviewed by the authors. Dr. Dotterweich is head of the Department of Engineering, Texas College of Arts and Industries, at Kingsville, Texas, and Dr. Bennett is a petroleum consultant of Houston.

THE rapidly increasing number of gas markets being developed in high pressure natural gas pools, capable of producing condensate in economically commercial quantities, dictates that attention be directed to the actual loss of light hydrocarbon liquid fractions by retrograde condensation. This is to permit a better understanding of conventional cycling policies, growing out of the acceptance of cycling as a conservation measure, in the absence of a gas market, when available field and laboratory data are investigated.

The rapid strides in gas technology, which received considerable impetus during the recent war, now make available to the petroleum industry many valuable processes by which greater subsurface and surface economics may be effected in the processing of this nation's ever-increasing number of high pressure natural gas condensate fields.

During the past ten years many areas have been discovered, particularly in the South Texas and gulf coast districts, in which the hydrocarbons, in most cases, exist entirely in the vapor phase in the formation, but when produced will partially condense upon reduction in pressure or temperature, or both. This phenomenon, termed retrograde condensation, is observed in the so-called gas-distillate or preferably gas-condensate fields. The phenomenon is now well known and generally understood and will not be discussed in detail.

As deeper drilling is conducted in the areas above mentioned, it is believed that proportionally more and more pools of the gas-condensate type will be discovered and the condensate recovery phase of the industry will become correspondingly more important as time goes on.

"Cycling" was first inaugurated on a commercial scale about 1938, for the purpose of preventing precipitation and loss of liquids in gas reservoirs and for the prevention of waste of the by-product gas. In natural gas cycling the by-product, or residue gas, is compressed and injected into the same reservoir from which it was produced to maintain pressure and to cause unprocessed or wet gas to be moved to producing wells for delivery to the recovery plants.

In the absence of a commercial gas market, natural gas cycling was accepted, in many instances, regardless of the recoverable G.P.M. (gallons per 1000 ft.) of the gas. In certain cases the low G.P.M. content of the gas processed by cycling methods may be questioned from a conservation viewpoint, when it is observed that modern petro-chem processes make possible the conversion of the lighter hydrocarbon gases into valuable liquid hydrocarbon fractions with surprising over-all conversion efficiencies, which we shall discuss later.

As the cycling phase of the petroleum industry grew and progressed, and improved methods of long distance transmission of natural gas brought additional gas markets to the nation's gas-condensate fields, many questions have arisen as to the economic feasibility of cycling low G.P.M. gas-condensate reservoirs, in the absence of an effective water drive, to maintain pressures. Conservation commission rules and regulations and the protection of correlation rights also complicate the problem.

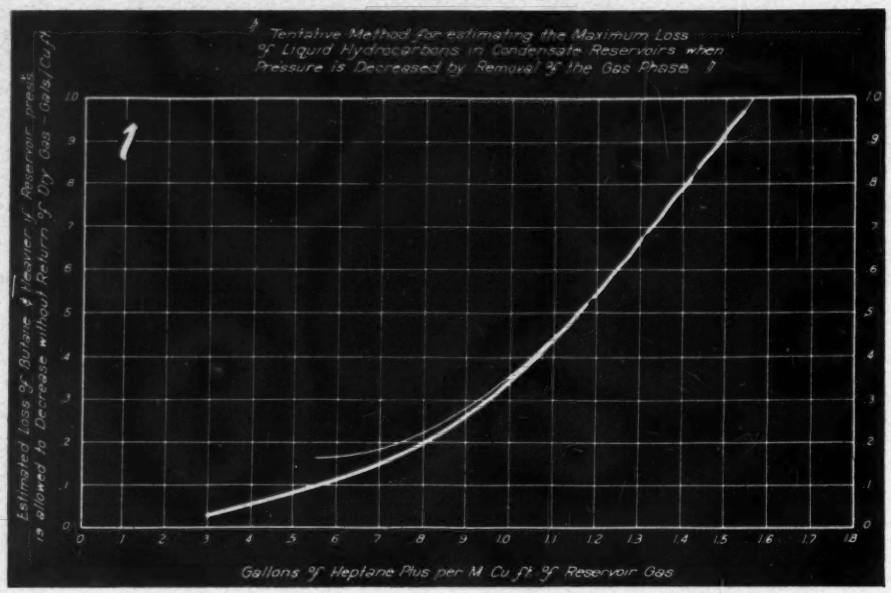
In determining the effect of retrograde condensation in single phase reservoirs, two methods of investigation under isothermal conditions (constant reservoir temperature) have been used. When the pressure on a hydrocarbon system is reduced by expanding the volume of the container, the term "flash" separation applies, and all the original components of the hydrocarbon systems are retained throughout the test. Should the pressure on such a system be reduced by withdrawing gas from a constant volume container, the term "differential" separation applies. In both cases the amount of liquid produced is observed and reported on the conventional retrograde curves.

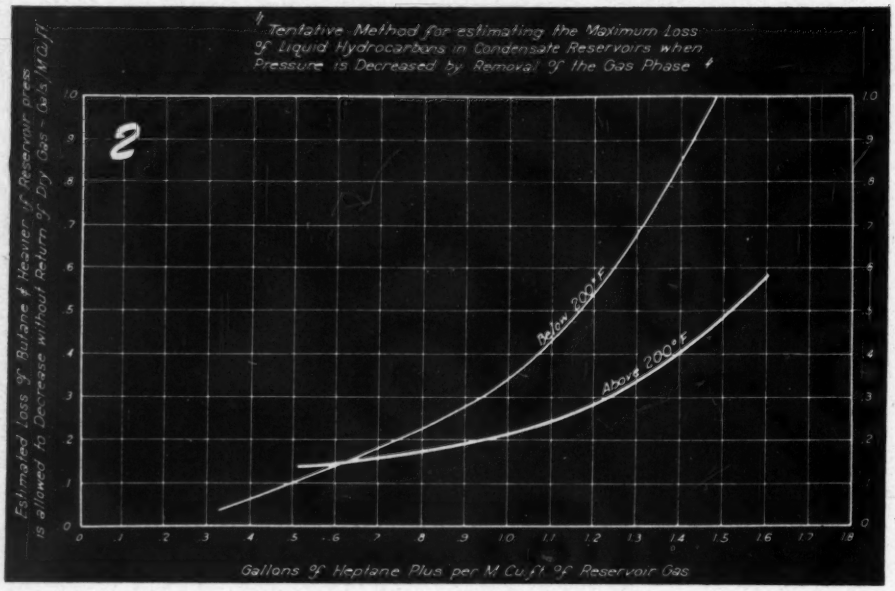
Two types of apparatus have been developed, in conducting retrograde condensation tests, and both should give essentially the same results when properly operated, and when truly representative samples of reservoir fluid are available. Since development of the United States Bureau of Mines method, in which continuous sampling and analysis in the field is used, the authors believe this procedure well predicts actual reservoir conditions (laboratory samples supplement field analysis) as well as can be reflected from laboratory and field data. A paper read at this annual meeting ably set forth the numerous problems in connection with continuous sampling. Recognition of the Bureau of Mines methods, and the excellent work of its personnel in connection with the cycling industry, is hereby accorded. Some of the work done by the bureau technicians has been studied, analyzed and used in this discussion.

It now appears desirable to state

TABLE 1. LOSSES FOUND FOR GASES FROM INDIVIDUAL FIELDS

Field	*Butane Plus G.P.M.*	*Butane Plus G.P.M. loss*	*Loss Percentage*	*Heptane Plus G.P.M.*
A	1.190	.18	15.1	.630
B	.903	.04	4.4	.335
C	1.000	.06	6.0	.418
D	1.035	.045	4.3	.393
E	1.097	.068	6.15	.364
F	1.380	.138	10.03	.512
G	1.555	.132	8.51	.745


Tentative Method for estimating the Maximum Loss of Liquid Hydrocarbons in Condensate Reservoirs when Pressure is Decreased by Removal of the Gas Phase
1
Estimated Loss of Butane & Heavier if Reservoir pres. is allowed to Decrease without Return of Dry Gas - Gals./Cu.Ft.
Gallons of Heptane Plus per M Cu.ft. of Reservoir Gas


Tentative Method for estimating the Maximum Loss of Liquid Hydrocarbons in Condensate Reservoirs when Pressure is Decreased by Removal of the Gas Phase
2
Below 200° F
Above 200° F
Estimated Loss of Butane & Heavier if Reservoir pres. is allowed to Decrease without Return of Dry Gas - Gal./M Cu.Ft.
Gallons of Heptane Plus per M Cu.ft. of Reservoir Gas

briefly the circumstances which led up to the development of the tentative method for predicting retrograde losses from gas analysis described and discussed in this paper.

Throughout the entire period of World War II, the United States Bureau of Mines, at the request of the Petroleum Administration for War, carried out a series of comprehensive studies of newly discovered gas-condensate fields in an effort to aid in expanding gas cycling operations. This was for the purpose of increasing the quantities of liquid products obtainable, which are known to be of great value in the production of synthetic rubber, aviation fuel, explosives, chemical raw materials and in other uses.

These reports gave, in addition to many other valuable data, information relating to the retrograde loss in the reservoirs studied. Since this work was carried on with extreme accuracy, the physical properties of only seven reservoirs were reported in detail (Table 1). In studying this information, Henry M. Brown, then director of the Natural Gas and Gasoline division of PAW District 3, suggested that all of the available data be studied with the idea of developing some suitable graphic method of predicting retrograde losses in a gas-condensate reservoir, when the composition analysis of the reservoir fluid was known. With this in mind, and using the data developed by the Bureau of Mines, study was given to the development of curves and it was found, after extensive investigation, that a very smooth curve developed when the heptane plus fraction in G.P.M. was plotted against the loss of butane plus due to retrograde condensation where no dry gas was returned to the reservoir. Several companies also furnished data and their personnel offered valuable suggestions in this work.

As above stated, the original curve developed from the Bureau of Mines data was very satisfactory and it is regretted that the bureau cannot, at this time, remove the restricted classification of this information, so that the work of Eilerts and his associates could be published and the curve given with all the supporting data. In developing the curves presented here, the authors choose to call them tentative. Other data mentioned were used and since the curves are partly based on bureau data, only the tentative curves, without complete supporting data, are given at this time. It is hoped that this work may be expanded with greater detail in the near future.

Fig. 1 gives the first curve developed. It will be observed that should the G.P.M. of heptane plus be available from the analysis of the reservoir gas the loss in G.P.M. of butanes plus may be estimated from the curve. It can be seen that with increased G.P.M. of heptane plus content in the reservoir the loss increases until the slope of the curve is constant and a maximum from about 1.00 G.P.M. of heptanes plus and higher, when the temperature of the reservoir is not taken into consideration.

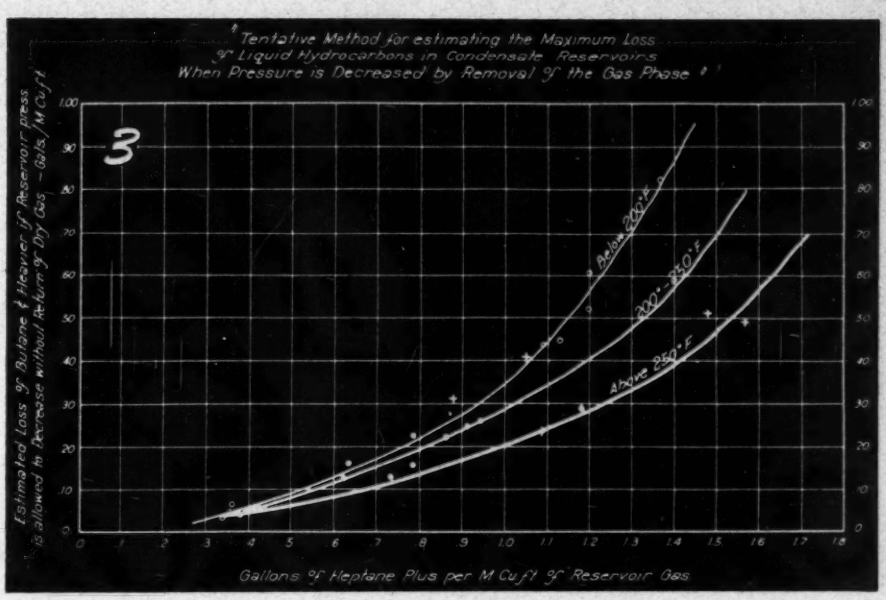
In analyzing this data, it was suggested by a member of one company that two curves be developed, one for reservoirs having temperatures below 200° F, the other for those above 200° F (Table 2). He observed a relationship which is reported in Fig. 2. It

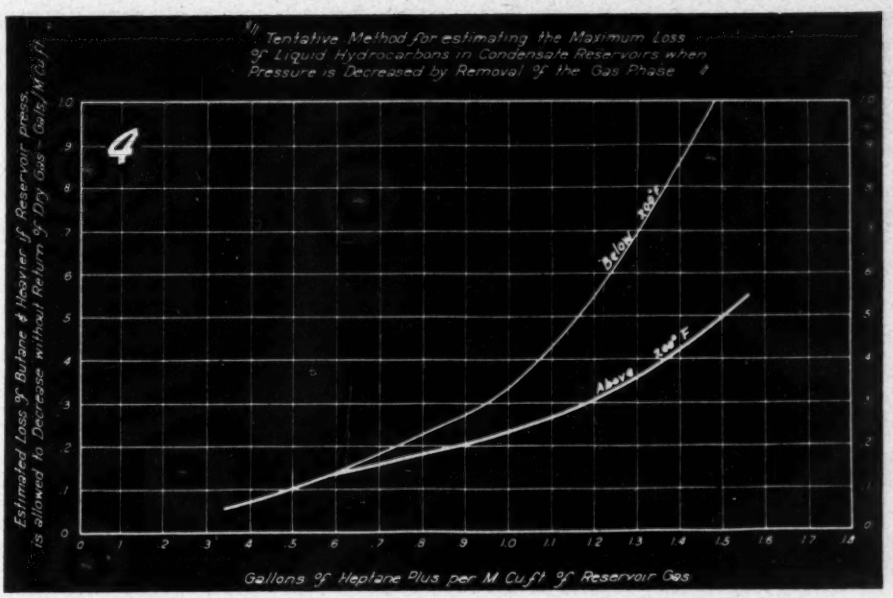
TABLE 2—DATA USED IN TENTATIVE METHOD

Reservoir Temperature	*Heptane Plus G.P.M.*	*Butane Plus G.P.M. Loss*
Reservoirs Above 200° F.		
260	1.570	.495
254	1.480	.521
249	1.195	.276
210	.783	.225
252	.88	.337
242	.79	.159
273	1.095	.243
236	.943	.258
229	.915	.25
251	1.047	.41
201	.630	.18
206	.859	.23
230	.418	.06
217	.612	.138
233	.745	.132
Reservoirs Below 200° F.		
188	1.368	.832
188	1.195	.597
188	1.195	.517
199	1.133	.46
193	1.089	.44
172	.335	.04
154	.393	.045
150	.364	.068

will be noted there is a tendency for the curves to cross when the content is about 0.650 G.P.M. of heptanes plus.

The authors have studied the data with attention being directed to reservoir temperature, and curves for reservoirs below 200° F, 200° F to 250° F, and above 250° F have been developed. These are shown on Fig. 3. At the present time sufficient reliable data are not available to definitely predict curves for all different temperature groups, but it is highly probable, and it is believed that as additional data are developed, the pattern as suggested will be confirmed. A study of the curves suggests that as reservoir temperature increases there is a decrease in the loss resulting from retrograde condensation. From this it may be anticipated that retrograde losses from deep structures will be less than from shallow ones. At present, the authors believe sufficient reliable data are available to draw the tentative curves for reservoir conditions above and below 200° F and such tentative curves are set forth in Fig. 4. These curves will be used in developing the ideas set forth in this paper in discussing the advisability of cycling low content reservoirs where a market is available for the sale of gas.


Tentative Method for estimating the Maximum Loss of Liquid Hydrocarbons in Condensate Reservoirs When Pressure is Decreased by Removal of the Gas Phase
3
Estimated Loss of Butane & Heavier if Reservoir press. is allowed to Decrease without Return of Dry Gas - Gals./M Cu.ft.
Below 200° F
200° - 250° F
Above 250° F
Gallons of Heptane Plus per M Cu.ft. of Reservoir Gas


Tentative Method for estimating the Maximum Loss of Liquid Hydrocarbons in Condensate Reservoirs when Pressure is Decreased by Removal of the Gas Phase
4
Estimated Loss of Butane & Heavier if Reservoir press. is allowed to Decrease without Return of Dry Gas - Gals./M Cu.ft.
Below 200° F
Above 200° F
Gallons of Heptane Plus per M Cu.ft. of Reservoir Gas

Figs. 4 and 5

A study of Fig. 4 indicates that in all reservoirs for fluids containing about 0.600 G.P.M. heptane plus and less, the two curves coincide. With this in mind well fluids indicating about 0.600 G.P.M. of heptanes plus were studied concerning the loss in per cent and loss in G.P.M. of butanes plus, when plotted against the G.P.M. of butane plus in the reservoir fluid. Fig. 5 reflects this correlation and it will be noted that for well effluents containing about 1.18 G.P.M. of butanes plus, the retrograde loss is about .12 G.P.M. of butane plus or about 10%. Since there are substantial data on reservoirs of this content, suggesting lower losses, it appears desirable to state, until more data are available, that reservoirs with 1.18 G.P.M. of butane plus would have a maximum loss from retrograde condensation of 10% or less of their liquefiables in the absence of cycling. In estimating this loss it should be pointed out that this is the maximum loss which may occur in the absence of revaporization and the sweeping of any condensate into the well bore; thus the 10% appears to be a definite maximum loss. This loss assumes a well spacing and operation that will permit moving all wet gas to producing wells. Practical experience over many years indicates this to be impossible and the above losses will necessarily have to be increased because of sweep pattern efficiency.

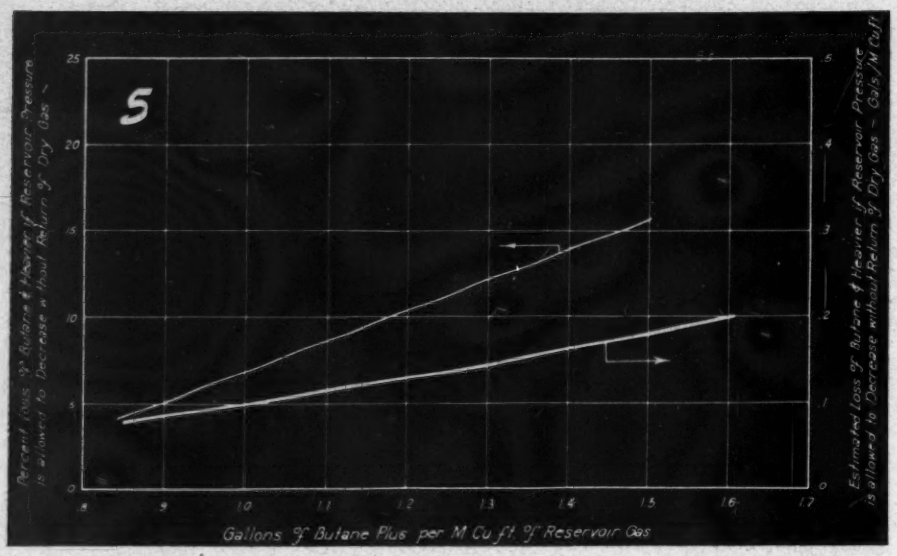
Having established the maximum possible and improbable loss at 10% of butanes plus in the reservoir (for gas with 1.18 G.P.M. of butane plus, or less) in the absence of the return of the dry gas for pressure maintenance, other factors tending to reduce such a probable loss become evident.

It has been reported that to reinject the dry gas and reprocess the stripped gas, after cycling, when 75% of the reservoir is swept out by the injected gas, approximately 1.81 lb. of dry gas per thousand cubic feet of reservoir gas is required. Assuming 0.600 gravity, this gives about 40.0 cu. ft. of dry gas per Mcf. of original reservoir gas that must be used to offset the maximum loss of .118 gal. of butane plus in adsence of cycling.

The value of 40.0 cu. ft. of dry gas is better seen in terms of liquid hydrocarbon fractions when we apply the present trend of converting 10 Mcf of dry gas into about one barrel of liquid hydrocarbons, part of which may include usable oxy-hydrocarbon chemicals. Thus 40.0 cu. ft. of dry gas becomes potentially .173 gal.* of valuable liquefied hydrocarbons. To offset the maximum and highly questionable loss of .118 gal. of butane plus, an amount of dry gas, equivalent to .173 gal. of hydrocarbon liquefiables, must be expanded. Using the equivalent of 0.173 gal. of liquid hydrocarbon material for reinjection, leaks and processing losses, reference to Fig. 4 suggests cycling is questionable for gas with 0.70 and 0.80 G.P.M. heptane plus content in reservoirs below and above 200° F respectively.

The inadvisability of cycling 1.18

*Calculated from latest data on the Synthine Process.



G.P.M. gas is further confirmed when we take into consideration the retrograde loss that cannot be prevented due to pressure drop even in the most efficient cycling operation, and when the possibility of revaporization is considered and the subsequent sweeping of condensed hydrocarbon fractions into the well bore by the movement of the formation gas.

As previously noted, the loss of liquefiables increases with increased heptane plus fraction of the reservoir fluid. Therefore, with higher G.P.M. fluid content, the necessity of cycling becomes apparent unless adequate steps are taken to insure the recovery of the condensed fluids from the reservoir. Should a gas market be present under such conditions the reservoir could probably be conservatively operated in one of the following two ways: (1) A portion of the dry gas being delivered to pipe line operations with the required amount of injected gas made available by water gas injection and pressure maintenance in the reservoir until the completion of the cycling program; (2) processing the reservoir without cycling and denuding the reservoir of its condensed liquefiables at a lower pressure by sweeping with the lower gravity and lighter water gas. Before entering into a discussion of these possibilities a description of the method of water gas production using "cheap oxygen" and natural gas is in order.

"Cheap Oxygen"

Prior to the war the obtaining of commercial oxygen by fractional distillation of air was carried out to a limited extent. The high cost of this oxygen was occasioned by the high working pressure and expensive chemical means of removing carbon dioxide and water vapor. Recently, a newer process, termed "cheap oxygen," has been developed which uses lower pressures and removes water vapor and carbon dioxide by "cold regeneration" methods. Combined with other developments this process suggests that we may be entering a new era in which hydrocarbon gases will not only be used as fuel or a chemical raw material but as both. As an example, in the production of hydrogen for the manufacture of synthetic ammonia, approximately one volume of natural gas was required as fuel to convert one volume of natural gas into water gas, and subsequent conversion into hydrogen to be used in the synthesis of ammonia. With "cheap oxygen" available a mixture of steam, oxygen, carbon dioxide and methane may be made to react under controlled conditions to give water gas (hydrogen and carbon monoxide). In this process sufficient energy in the form of heat is liberated for process steam and power while the reaction is stopped at the energy level to give the desired water gas; thus the hydrocarbon gas is employed to liberate energy and at the same time is available as a chemical raw material.

One prominent executive in the cycling industry has suggested that with this process it may be possible, in cycling operations, to supply a pipe line with dry gas and make up the required amount of cycle gas with water gas produced from a portion of the dry gas, because one volume of methane gives approximately three volumes of water gas. However, the pressure at which this reaction must be conducted at present, indicates expensive compression rates in high pressure reservoirs. The application to the second suggested method may be of more practical importance for the following reasons:

When the reservoir is produced in the absence of cycling and when the pressure falls to about 1000 lb., water gas production could then be initiated and the reservoir swept out with lighter gravity gas having a low Btu content (about 300 Btu per cubic foot). Such an operation could have a greater tendency to revaporate the heavier liquid fractions or sweep them to output wells and the resulting gas would have a higher Btu content than the injected water gas, even after gasoline removal, and could then be used as fuel or chemical raw material. Full deliveries to pipe line could be currently maintained as only a portion of the gas produced would be required to manufacture a volume of water gas equivalent to the natural gas output of the wells.

Fuel Needs Decreased

Naturally, the use of dry gas as both a source of energy and a raw material in the form of water gas would tend to decrease the fuel requirements, as outlined, to offset the economics of cycling reservoirs of 1.18 G.P.M. and less. Should such a procedure be used in low G.P.M. reservoirs it would, because of the lower gravity gas, tend to cause a greater amount of revaporation. The net result would be not to disturb greatly the material balances previously referred to in processing reservoirs having low G.P.M. content fluids.

Another interesting and possible method adapted to the recovery of liquid hydrocarbon fractions, which have wet the sand face due to retrograde condensation, is the use of chemicals which selectively reduce the retentivity of absorbed liquids. Present research conducted along these lines suggests such possibilities. Continued investigation along this line should be undertaken to complete the study and properly evaluate its economics, as in the near future the process may become of profound importance in gas cycling operations. Finally, the almost absurd possibility of using nature's reservoirs as high chemical reactors must be recognized. Just as solid fuels like coal have been gasefied in place, using their natural beds as huge reactors, so may our gas condensate reservoirs, with their great pressure and high earth temperature, be made to react their hydrocarbon gases with selected and controlled quantities of chemicals to give valuable chemical raw materials and products to be used in the ever expanding petro-chemical industry of today and tomorrow.

Economics and Effectiveness of

CATHODIC PROTECTION

On Large Diameter Pipe Lines

By N. K. SENATOROFF,

Southern Counties Gas Co., Los Angeles

N. K. Senatoroff

WHAT EITHER cathodic protection or pipe line wrapping alone might fail to accomplish in protecting a pipe line from corrosion, a combination of both might do. This, the author's thesis, is exemplified in a report on the experience of the Southern Counties Gas Co. of California in trying to defeat corrosion in a 26-in. high pressure natural gas transmission line in San Joaquin County.

In 1941, the line, then ten years old, was leaking to such an extent that a study was undertaken to find a means of reducing repair costs sufficiently to keep the line in operation for several more years. Drainage stations were decided upon as an experiment, and the first one was installed in October of that year, with the second being erected in January, 1943. Studies were made of the results, which were found not to be up to expectations, because the electrolytic damage to the line prior to the installation of cathodic protection had been so extensive that there existed numerous pits in the pipe which had actually perforated the pipe wall. So reconditioning of the pipe was tried, with considerable emphasis being placed upon the thickness of the protective material used. The results to date are reported in this article, which was prepared for presentation at the Pacific Coast Gas Association Transmission Conference, by Mr. Senatoroff, a chemical engineer.

ALTHOUGH the effectiveness of applying electrical drainage to pipe lines, resulting in almost complete secession of metallic corrosion, had been known and universally accepted for many years by the engineers of the gas, oil, and water industries, occasionally even today serious differences of opinion arise among them during discussions involving selection of the most effective and at the same time the most economical method of corrosion mitigation for the new lines, or for the lines proposed for reconditioning.

Some engineers favor first class protective coatings consisting of enamels, shielded with asbestos wrapper, and the very minimum of cathodic protection to reinforce the effectiveness of protection rendered by the coating, while others are recommending laying the lines bare with an idea of applying electrical drainage as required.

Both of the two schools of thought have on numerous occasions described in technical literature very successful and economically sound applications of their respective methods to pipe lines, and thus have contributed to the general knowledge of corrosion control by offering at least an alternate choice in selecting the best suited method of corrosion mitigation of the proposed project.

Occasionally in analyzing the possibility of applying these methods of corrosion protection to the job on hand, special cases may arise which present a rather intriguing opportunity for "straddling the fence" between the two methods. Because of purely local conditions, it might happen that neither of the methods of corrosion mitigation conveniently fits the proposed job. Sometimes it appears that it might be simpler and easier to coat the entire line with some coating, not necessarily of the first class quality, and to compensate for its weakness by installing sufficient number of drainage stations, in order to provide the desired protection to the pipe line, thus distributing protective load equally between the coating performance and the electrical drainage.

San Joaquin Valley Line

It is the purpose of this report to discuss the preliminary study of the costs of corrosion protection as applied to the proposed reconditioning of a section of 26-in. O.D. high pressure natural gas transmission line in San Joaquin valley, California.

The line in question is all welded pipe line, ¼-in. wall, weighing 68.75 lbs. per linear foot, which had been installed in 1931 and had been wrapped with asphalt coating and asbestos wrapper, manually applied by means of slings over the ditch. The coating job had been carefully inspected and applied in accordance with what were then the best known methods of coating technique, but by present standards, of course, it could hardly be termed as a first class job. By 1941 the leak repair costs in this section of the line had reached such a figure that a job study was undertaken to determine whether a reconditioning program was in order or whether the application of electrical drainage, at reasonable cost, would enable operating department to keep the pipe line in service for a few more years.

In this case we were fortunate to find sufficiently accurate past records of leaks and maintenance costs for several years back, which assisted us in the analysis of not only the frequency and location of the leaks, but also in evaluation of the leak repair costs.

Typical Installation

Based on the study of these records it was decided to install a few drainage stations at the most corrosive locations of the line and observe their effectiveness by periodic potential surveys of the line and by perusal of leak repair records.

The actual location of the stations, their output capacities and their spacing were, of course, not necessarily in accord with the best theoretical design requirements as given in the attached chart of "Rectifier Capacity vs. Coating Resistance," because of their dependence on such factors as availability of rights-of-way, proximity of other underground structures, etc., but on the whole they were in conformity with the average station location requirements.

The first station, 85-1, of gas driven generator type, of 5 kw capacity and

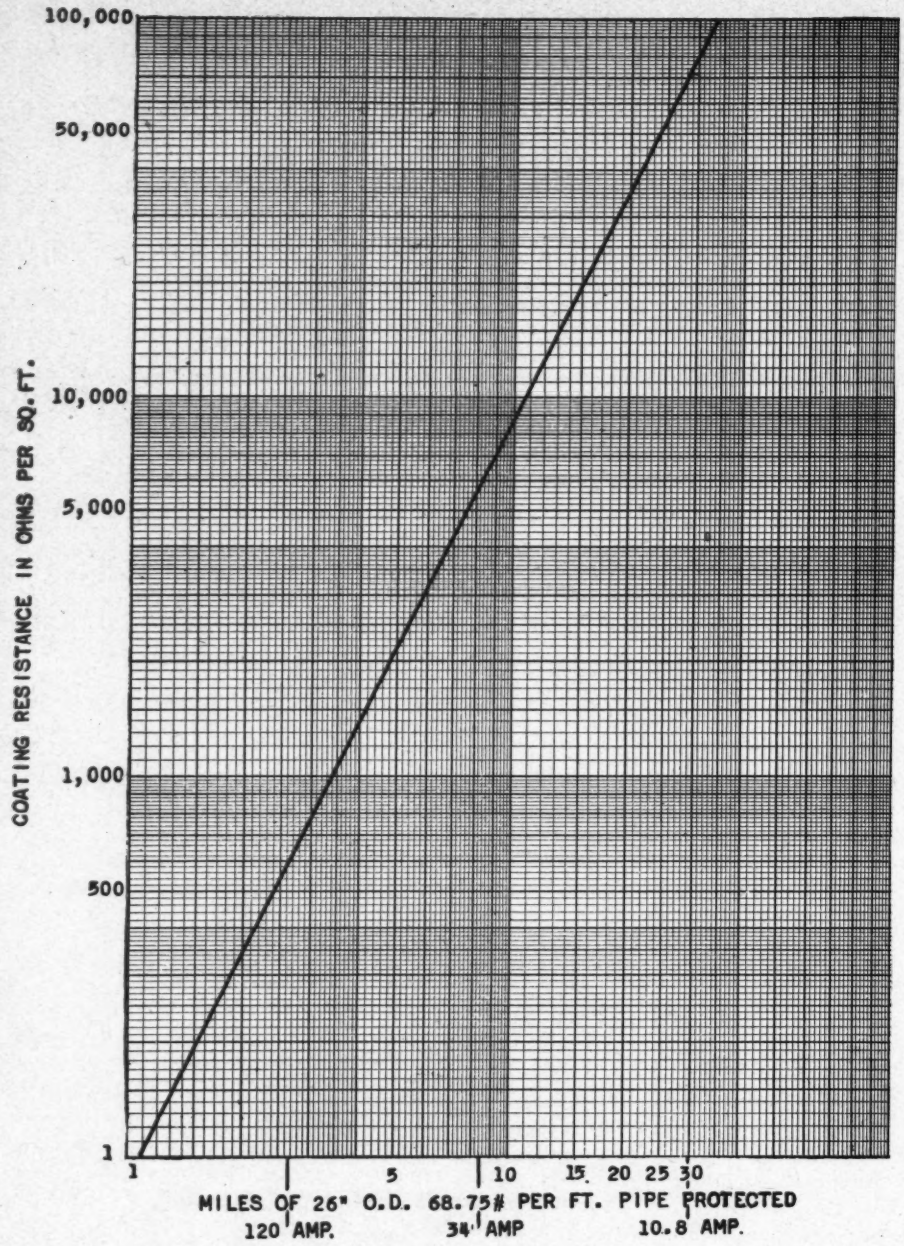


Fig. 1. Rectifier Capacity Needed

10 to 40 volts with maximum 150 amp. output, was installed in October, 1941. The second, 85-2, similar type station had been put into service January, 1943.

Following the placing of these two cathodic protection stations, it was found that the electrical drainage did not reduce the frequency of leak repairs as was expected and that the number of leaks per mile per year remained at a more or less constant figure.

Examination of the pipe and the study of metal loss of corrosion control coupons revealed that the cathodic protection was effective as far as present day corrosive action of soil was concerned; however, the electrolytic damage to the pipe prior to the installation of cathodic protection had been so extensive that there existed innumerable pits in the pipe which had actually perforated the pipe wall and were undetected only because of the minuteness of gas leaks. Later on, of course, these leaks increased in volume and continued to show up. Leakage repair costs remained high even after cathodic protection had been applied. Undoubtedly after a period of years the frequency of leaks per mile per year would have eventually decreased; however, the importance of uninterrupted and continued operation of this line made it imperative that leakage be eliminated as soon as possible.

Therefore, in the summer of 1944 the management had decided to recondition this section of the line by welding up individual pits exceeding in depth one half of the pipe wall, replacing portions of it which had corroded beyond reconditioning stage, and recoating the line with coal tar enamel, asbestos wrapped coating. It was also decided to retain and operate cathodic protection stations after reconditioning of the line.

In the course of preliminary discussion of coating specifications, the question of the allowable minimum thickness of enamel was brought up. Since at the outset of the reconditioning program it was decided, as far as pipe protection was concerned, to reinforce the coating performance with supplementary drainage, a group of engineers questioned the need of additional expenditure of money for an extra $\frac{1}{32}$ in. thickness of enamel in order to obtain a minimum of $\frac{3}{32}$ in. and an average $\frac{4}{32}$ in. enamel coat if the $\frac{2}{32}$ in. minimum and an average of $\frac{3}{32}$ in. thickness of enamel would suffice. This was with the understanding, of course, that all "holidays" in the coating would be repaired before final backfill and the entire coating job would be very rigidly inspected.

Thicker Enamel Favored

Since coating application on the reconditioned portions of the line was to be performed by the pipe line traveling type of machine over the trench —and this method of application had never been tried on this size of pipe in Southern California, the group of engineers favoring the heavier enamel thickness of the protective coating requested from the manufacturer of the coating material information regarding field experiences with similar equipment elsewhere on large diameter pipe lines. The manufacturer, describing the finding of engineers on the Tennessee gas transmission line, replied as follows:

(a) "Where coating is $\frac{3}{32}$ in. plus, the only holidays the detector is picking up is where the machine starts and stops at the welds where the sections are joined or where the coating shoe drags (when out of adjustment). Field inspection of 4400 ft. of pipe coated in one day showed that holidays, aside from where coated pipe rested on skids, were less than 10 in 1000 ft. of pipe coated."

(b) "Inspection of 3600 ft. of pipe with $\frac{3}{32}$ in. average thickness of enamel, aside from the skid marks, where coated pipe rested on skids, averaged 60 to 1000 ft. of pipe coated."

(c) "The required extra patching on pipe enameled with average thickness $\frac{3}{32}$ in. enamel coating machine applied is estimated at twice the cost of the extra enamel required for a minimum thickness of $\frac{3}{32}$ in."

These statements forthcoming from the enamel manufacturer were accept-

TABLE 1. CATHODIC PROTECTION—COST & OPERATING DATA
Before and After Reconditioning

Unit No.	Current Amps.	Miles Protected	Pipe Size	Investment	Annual Maintenance and Operating Costs	Remarks
85–1	90	4.4	26″	$5984.48	$370.78	Before reconditioning
85–1	25	8.5	26″	$5984.48	370.78*	After reconditioning

*Less difference of fuel cost to operate station at 25 as against 90 ampere output.

ed with natural reservations and brought additional study involving $^{2}/_{32}$ in. vs. $^{3}/_{32}$ in. minimum coating costs.

In order to check the recommendations of the manufacturer, the coating application costs on a similar job were examined. The actual figures for the application of the coating showed that the application cost equalled $2833.28 per mile. The figure included labor, contractor's overhead and profit and equipment but did not include material.

Coating material requirements and their costs based on current market prices and not including material incidental to coating repair, patching of holidays or skid marks and other unavoidable losses were estimated as follows on per mile basis:

Amount and cost of pipe line enamel for $^{3}/_{32}$ in. uniform coating thickness = 12.08 tons/mile. Cost of enamel per mile @ $50 per ton = $604. $^{1}/_{32}$ ± variation in the coating thickness amounts to $^{1}/_{3}$ of $604 or $201.33 per mile of pipe line.

Amount and cost of pipe line primer is equal to 76 gal/mile. Cost of primer per mile @ $0.505 per gallon = $38.38.

Amount and cost of asbestos wrapper is equal to 390 squares per mile. At $1.24 per square its cost per mile equals $483.60.

Total cost of material per mile is equal to $604 plus $38.38 plus $483.60 equals $1125.98

Total application cost per mile = 2833.28

Protective coating cost per mile = $3959.26

Thus $^{1}/_{32}$ in. coating thickness variation amounts to only $\frac{\$201.33 \times 100\%}{\$3959.26}$, or 5.1%

From the cost study given above of coating material involved in providing an additional $^{1}/_{32}$ in. thickness of enamel to the $^{3}/_{32}$ in. average thickness, occasionally specified as satisfactory coating requirement, it is quite apparent that the extra cost is fully justifiable, providing the increment of enamel thickness determines the differences between the first class coating job and an average quality job.

An expenditure of approximately $200 per mile of the 26-in. line for the improvement of the protective value of the coating is being gradually refunded from the day the line is put back into service, as is apparent from Table I, which summarizes the cost and operating data of the cathodic protection station, 85-1, before and after reconditioning.

The return on investment appears in the extension of line protection by electrical drainage from 4.4 miles to 8.5 miles and also in marked decrease from 90 amperes to 25 amperes of the station output requirements.

Since the life of the "grounds" is directly related to the amperage output of the station, the rate of depreciation of the capital invested in the "grounds" shall likewise be diminished. Moreover, if so desired, the rather large and expensive generator unit could be replaced with a smaller one resulting in reduction of capital investment of the station.

In case it is decided to retain the present type and size of the station, its extra output capacity could be conveniently marketed for cathodic protection of other neighboring underground structures.

Utility Appliance Corporation Designs Own Conveyor Lines

WHEN engineers of the Utility Appliance Corp., Los Angeles, found it impossible to buy conveyor lines recently, they designed and built their own of available materials. Jack Abbott, head of mechanical development, designed the lines and supervised the manufacture of the parts, all of which were made by Utility with the exception of the electric motors which power the lines and some of the gears and bearings.

Assembly of Utility floor furnaces is accomplished on a 115-ft. subassembly line (shown above) and a 50-ft. final assembly line. Machines for final fabrication of component parts are arranged on each side of the subassembly line. At the head of the second line the assembly is completed, and halfway up the line the furnaces are tested and "burned-in". When they reach the foot of the line, the furnaces are dropped into waiting crates and carted to the shipping department.

Time required for fabrication of the parts and installation of the two lines was remarkably short—20 days for the subassembly line, and 14 days for the final assembly line. Other lines now under construction will be used for the production of other merchandise.

View of subassembly line designed and built by Utility Appliance Corp., Los Angeles, for production of floor furnaces.

THE PANHANDLE FIELD

The World's Largest Natural Gas Reserve

By E. G. DAHLGREN

THE biggest natural gas field in the world, from the standpoint of original reserves, one of the biggest oil fields in Texas, the largest known reserve of helium gas—are the proud distinctions of the Texas Panhandle Field. Fig. 1 shows an industrial map of the field.

The history of the Panhandle Field goes back to 1904 and 1905 when Charles N. Gould, while making a study of the water supply conditions for the U. S. Geological Survey, became convinced that the structures should be tested for oil and gas.

The Amarillo Oil Co. was organized and the No. 1 Masterson was completed on December 9, 1918 as a 10 MMcf gasser. Gas markets were practically non-existent and, even after the Gulf Production Co. No. 2 S. B. Burnett completion as a 190-barrel oil well on May 5, 1921, the region's development was slow. Drilling progressed, however, and the 1925 oil output of 1,287,000 barrels for the Panhandle Field increased to 24,751,000 barrels in 1926. A peak oil production of 41,413,000 barrels was reached in 1927.

The Panhandle Oil and Gas Field is located astride a buried group of granite mountain peaks which form what is known geologically as the Amarillo Arch. These mountain peaks continue in a southeasterly direction through the southwestern portion of Oklahoma and come to the surface as the Wichita Mountains at an elevation of 1000 ft. above sea level.

Extending in a southeast-northwest direction, the Panhandle Field sprawls diagonally across Moore, Potter, Hutchinson, Carson, Gray, Wheeler, and Collingsworth Counties. The extreme southeastern portion of Hartley County is also included. The field is approximately 130 miles long with an average width of 20 miles. The gas area is composed of 1,592,939 acres, and a present proven or semi-proven oil producing area of approximately 83,000 acres, produces sweet and sour gas. Oil production is confined to a series of pools extending along the north flank of the field for a distance of about 90 miles.

Four producing formations or zones in the Panhandle Field are productive in different areas. They are as follows: Brown Dolomite, White Dolomite, Moore County Lime, and Granite Wash. The Granite Wash is an eroded and disintegrated granite deposited along the lower flanks of the granite ridges.

E. G. Dahlgren

THE PANHANDLE Oil and Gas Field, largest in the world from the standpoint of original reserves, is composed of almost 1.6 million acres with reserves estimated in January at 19.3 trillion cu. ft. In Moore County, Texas, alone 619 gas wells are producing on an area of 543,086 acres with a potential of 18,484 MMcf per day. Much of the gas, which comes from four producing zones, is transported through 13 states to be delivered to many distant markets including such cities as Minneapolis, Chicago, and Detroit. This article depicts the importance of the Panhandle Field in our national economy, covering its history and development, the pipe line companies it supplies, problems in regulation, waste, and repressuring, carbon black production, and the future prospects of the field. This is Mr. Dahlgren's second comprehensive article on the nation's major sources of natural gas to be published in GAS, the first on the Hugoton Field appearing in May, 1945.

The sedimentary formations which overlie these buried mountains have been folded into an arch over the granite core and form an immense anticlinal fold into which the gas and oil have migrated and accumulated. Fig. 2 shows a structural map.

Gas occurs in the lowest formations of the Permian and the highest formations of the Pennsylvanian. The Granite Wash and the Moore County Lime are of Pennsylvanian Age. The most widespread gas-producing horizon is the dolomite series of Permian Age, which is also productive northward in the Hugoton-Guymon field extending from Texas through Texas County, Okla., into southwestern Kansas.

As of January 1, 1946, the natural gas reserves are estimated at approximately 19.291 trillion cu. ft. with the total gas production computed at 11.876 trillion cu. ft. at a pressure base of 14.65 psi. The original natural gas reserve is estimated at 31.167 trillion cu. ft. which is the largest original reserve of any known natural gas field in the world. The chart, Fig. 3, gives gas production and pressure data.

As of January 1, 1946, the total oil production was 535,925,454 barrels with an estimated remaining reserve of 300 million barrels. For all practical purposes, the oil area is not curtailed in production with the original oil acreage of 96,000 acres being reduced by 13,000 acres with wells plugged and abandoned.

As of March 1, 1946, a total of 1992 gas wells are producing with a potential capacity of over 32.5 billion cu. ft. per day. The oil area has 6069 producing wells with 4395 wells connected to natural gasoline plants which process 165 million cu. ft. of casinghead gas per day. Figures on the current status of production are given in Table 1.

TABLE 1. PANHANDLE FIELD, STATUS OF DEVELOPMENT, MARCH 1, 1946

COUNTY	West Sweet Zone			West Sour Zone			West Sweet Zone			TOTAL		
	Wells	Acres	Potential	Wells	Acres	Potential	Wells	Acres	Potential	Wells	Acres*	Potential Mcf
Carson												
Gas wells	361	167,104	5,402,399	27	7,577	136,051	....	....	....	388	174,681	5,538,450
Gas wells producing crude oil	4	1,120	12,000	3	346	4,250	....	....	....	7	1,466	16,250
Total	365	168,224	5,414,399	30	7,923	140,301	....	....	....	395	176,147	5,554,700
Collingsworth	....	....	....	....	....	....	2	320	1,650	2	320	1,650
Gray												
Gas wells	171	58,398	1,270,923	3	480	3,920	52	6,541	144,982	226	65,419	1,419,825
Gas wells producing crude oil	3	30	2,450	2	54	6,500	3	400	14,000	8	484	22,950
Total	174	58,428	1,273,373	5	534	10,420	55	6,941	158,982	234	65,903	1,442,775
Hartley	2	1,280	56,300	45	28,800	1,401,700	....	....	....	47	30,080	1,458,000
Hutchinson												
Gas wells	135	28,161	1,571,884	190	85,690	1,372,648	....	....	....	325	113,851	2,944,532
Gas wells producing crude oil	....	....	....	3	1,359	9,500	....	....	....	3	1,359	9,500
Total	135	28,161	1,571,884	193	87,049	1,382,148	....	....	....	328	115,210	2,954,032
Moore												
Gas wells	308	190,998	6,033,380	310	151,528	12,446,170	....	....	....	618	342,526	18,479,550
Gas wells producing crude oil	....	....	....	1	476	4,500	....	....	....	1	476	4,500
Total	308	190,998	6,033,380	311	152,004	12,450,670	....	....	....	619	343,002	18,484,050
Potter	47	29,540	935,300	....	....	....	....	....	....	47	29,540	935,300
Wheeler												
Gas wells	....	....	....	....	....	....	315	35,344	1,725,595	315	35,344	1,725,595
Gas wells producing crude oil	....	....	....	....	....	....	5	800	1,725	5	800	1,725
Total	....	....	....	....	....	....	320	36,144	1,727,320	320	36,144	1,727,320
Gas Wells	1,024	475,481	15,270,186	575	274,075	15,360,489	369	42,205	1,872,227	1,968	791,761	32,502,902
Gas wells producing crude oil	7	1,150	14,450	9	2,235	24,750	8	1,200	15,725	24	4,585	54,925
Grand Total	1031	476,631	15,284,636	584	276,310	15,385,239	377	43,405	1,887,952	1,992	796,346	32,557,827

*Developed = Limited to not more than 640 acres to any one well.

Moore County

Moore County is the most important gas producing county in the Panhandle Gas Field. A total of 619 gas wells are producing on an area of 543,086 acres. These wells have a total potential production of 18,484,050 Mcf and an estimated reserve of 8.511 trillion cu. ft. of natural gas. In the West Sweet Zone, 308 wells are located, and 311 wells are located in the West Sour Zone. Dumas, the county seat, has a population of between 6000 and 7000.

Pipe Lines

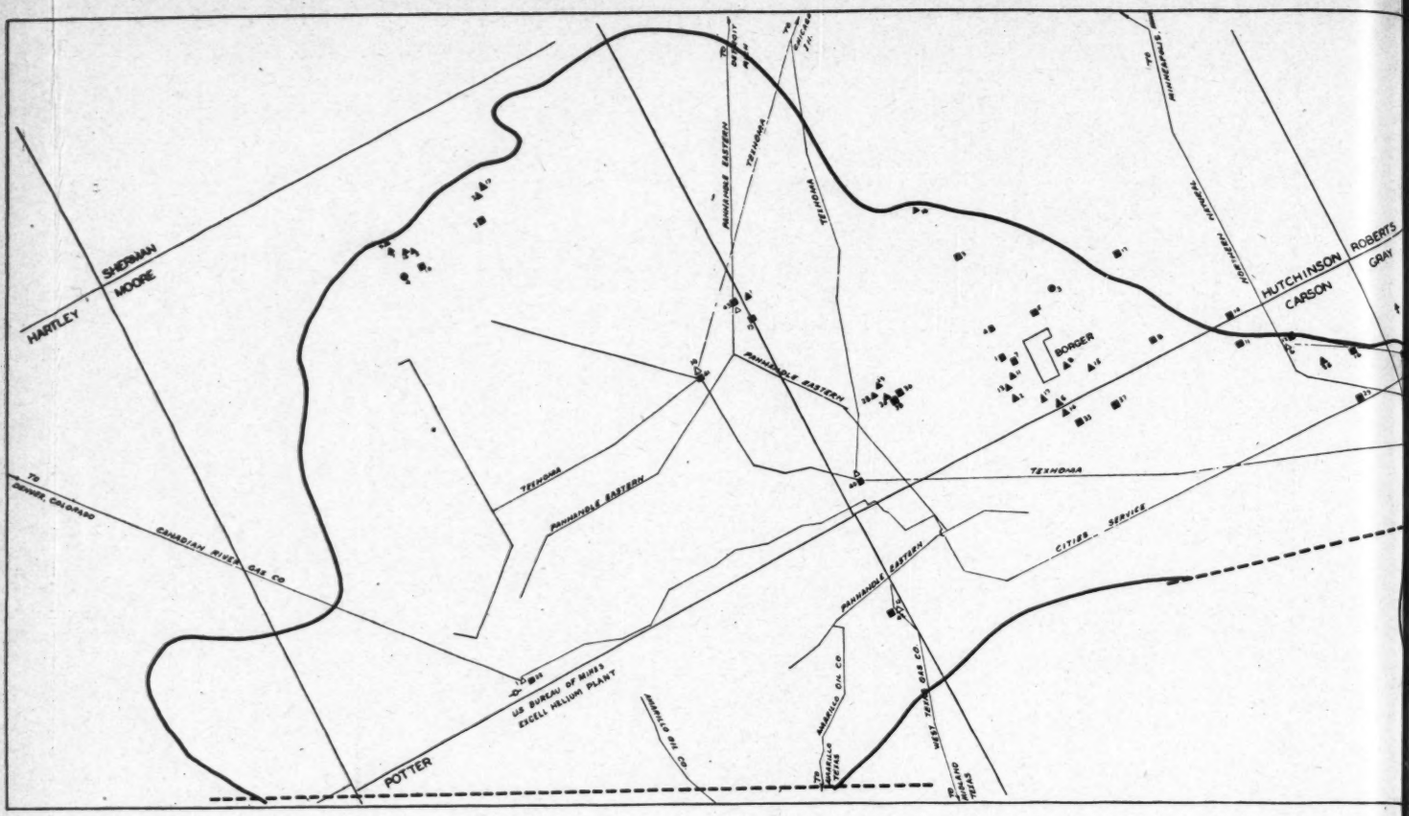
N. C. McGowen, president, United Gas Pipe Line Co., in his testimony before the FPC at Houston in February, 1946, gave the following information about gas pipe lines in the Panhandle Gas Field. Pipe line withdrawals for light and fuel in 1945 are given in Table 2.

Although the Panhandle field was discovered in 1918, and was soon determined to be a major gas reserve, more than nine years elapsed before any sizeable pipe lines were constructed to take gas from that field other than to supply the markets in towns and cities nearby. In 1927 the Cities Service Gas Co. constructed a gathering system and compressor plant in the Panhandle field and 250 miles of 20 in. pipe line between the Panhandle field and its pipe line system in Kansas, making connection therewith at Wichita, Kan. It further reinforced that system with a 130 mile 20 in. extension to Ottawa, Kan., and a 39 mile 16 in. extension from Ottawa to Kansas City. It is significant that the first large line to be built therefrom was constructed to take gas to an area that had used natural gas since 1884, but had had no large long term supply of gas, and therefore, had suffered many shortages of gas in the intervening years.

In 1928 the Canadian River Gas Co. began construction of the second large pipe line out of the Panhandle field. It is a 22 in. line, supplying the 22 in. pipe line of the Colorado Interstate Gas Co. which transports gas to Pueblo, Colorado Springs, Denver, and Cheyenne, and the Colorado Fuel and Iron Co.'s steel mill in Pueblo; it also supplies smaller communities and industries in New Mexico, Colorado and Wyoming.

In the fall of 1928 construction was begun on what is now the Consolidated Gas Utilities Corp.'s 14 in. pipe line out of the West Panhandle field to augment the gas supply from local fields to 30 communities in Oklahoma and 13 communities in Kansas.

The next line to be built out of the Panhandle field was the Panhandle Eastern Pipe Line Co.'s pipe line to Indiana. Construction was started in



WEST FIELD

No.	Sour Gas Name	Cap.
1	Huber	"I"	70,000
2	Magnolia	Sunray	60,000
3	Phillips	Canadian	20,000
4	Phillips	Johnson	111,000
5	Phillips	Pantex	38,000
6	Phillips	Ray Aband.	35,000
7	Phillips	Rock Creek	220,000
8	Phillips	Texroy	44,000
9	Portland	Pampa	40,000
10	Shamrock	McKee	250,000
11	Shell	Bryan "2"	18,000
12	Shell	Bryan "17"	28,500
13	Skelly	Armstrong	30,000
14	Skelly	Crawford	20,000
15	Skelly	Kingsmill	30,000
16	Skelly	Schafer	90,000
17	Skelly	Watkins	5,000

GASOLINE PLANTS

No.	Sweet Gas Name		Cap.
25	Canadian River	Bivins	100,000
27	Cities Service	Pampa	30,000
28	Danciger	Lefors	20,000
29	Hagy, H. & Marsh	Cargray	75,000
30	Henderson	Sanford	150,000
31	Magnolia	Kingsmill	30,000
32	Phillips	Bowers	28,000
33	Phillips	Carson	40,000
34	Phillips	Gray	109,000
35	Phillips	North	36,000
36	Phillips	Pampa	62,000
37	Phillips	Panhandle	30,000
38	Phillips	Sanford	130,000
39	Shell	Pampa "15"	14,000
40	Texoma	Fritch	225,000
41	Texoma	Station "22"	70,000
42	West Texas Gas	Wilhelm	45,000
43	Phillips	Sneed	225,000

EAST FIELD

No.	Sweet Gas Name	Cap.
49	Coltexo	"I"	60,000
50	Columbian	Shamrock	40,000
51	Phillips	Lefors	32,000
52	Smith	Sitter	50,000

COMPRESSOR STATIONS

No.	
1	Canadian River	Bivins
2	Cities Service Gas	Pampa
3	Cons. Gas Util.	Fritch
4	Cons. Gas Util.	Twitty
5	Lone Star	Shamrock
6	Northern Natural	Skellytown
7	Panhandle Eastern	Sneed
8	Phillips	Grayco
9	Texoma	Fritch
10	Texoma	Sneed
11	United	Shamrock
12	West Texas	Wilhelm

REFINERIES

No.	
1	Danciger	Pampa
2	Payward	Shamrock
3	Phillips	Borger
4	Shamrock	Sunray

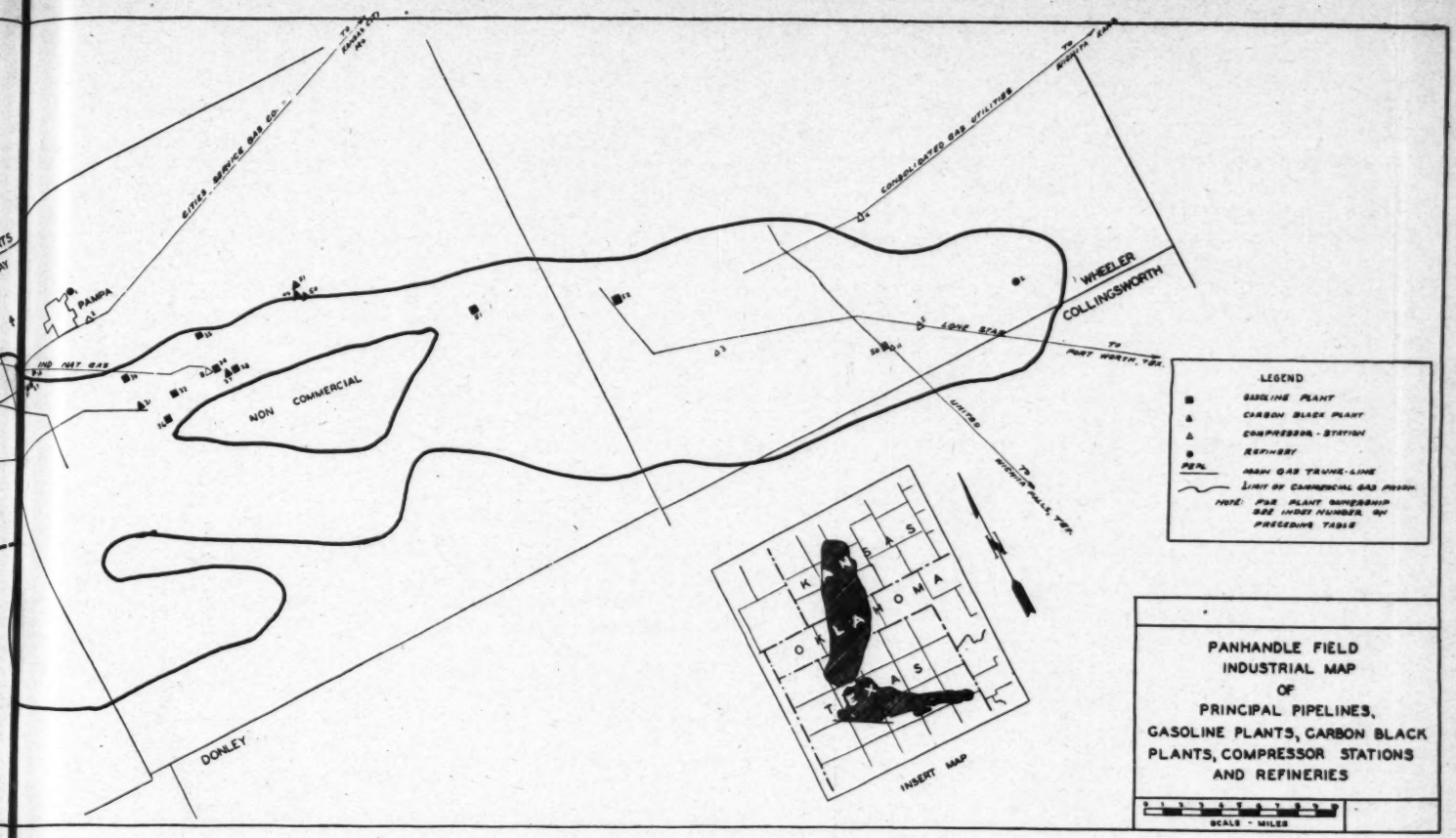
FIG. 1. INDUSTRIAL MAP OF PANHANDLE OIL AND GAS FIELDS SHOWING PRINCIPAL PIPE LINES, GA

1930 on the gathering system in the Panhandle field, and a 24 in. transmission line across Oklahoma and into Kansas, where another gathering system was built in the Hugoton, Kan., field and connected to the transmission line which originally carried the gas from those two fields through Kansas, Missouri, and Illinois to Rickville, Ind., where it connected with, and supplied the Ohio Fuel Gas Co., a part of the Columbia System. The original 24 in. line extended to a point south of Kansas City where a 22 in. line was utilized to Springfield, Ill., where a 20 in. line was installed for the distance to Rickville, Ind. Those systems supplied an area that used natural gas for a long time.

In 1930 and 1931 Texoma Natural Gas Co. constructed a gathering system, gasoline plant, and a line 24 in. in diameter from the West Panhandle field to supply the Natural Gas Pipe Line Company of America, which also constructed and put into operation its 24 in. line to Chicago. Texoma also constructed a gathering system and gasoline plant in the Panhandle field and a field compressor station.

The Northern Natural Gas Co. also constructed and began the operation of its 24 in. line from the Panhandle field to Omaha, Nebraska, and Minneapolis, Minn., in 1931.

Other smaller interstate pipe lines were also constructed from the Panhandle field to nearby communities in Oklahoma, Kansas, Colorado, New



STATIONS

Irvins
ampa
itch
witty
hamrock
kellytown
need
rayco
ritch
need
hamrock
ilhelm

RIES

ampa
hamrock
orger
unray

WEST FIELD

No.	Sour Gas Name		Cap.
1	Cabot	Armstrong	20,000
2	Columbian	Borger	9,000
3	Columbian	Cophil "95"	15,000
4	Columbian	Kingsmill "60"	12,000
5	Columbian	Sunray	75,000
6	Columbian	Wescar "52"	69,000
7	Continental	Continental	75,000
8	Crescent	Borger	15,000
9	Crown	Crown	12,000
10	General Atlas	Pampa	6,000
11	Huber	Borger	70,000
12	Moore County	Moore	33,000
13	Panhandle	Panhandle	22,000
14	United	Alexander	30,000
15	United	McIlroy	40,000
16	United	Reliance	40,000
17	United	Rock Creek	60,000
18	United	Stinnett	15,000

CARBON BLACK PLANTS

No.	Sweet Gas Name		Cap.
25	Cabot	Kingsmill	30,000
26	Cabot	Schafer	50,000
27	Carbon Blacks Inc.	Lefors	350
28	United	Combined	30,000
29	United	Sanford "A"	16,000
30	United	Sanford "B"	65,000
31	Texas-Elf	Bowers	50,000

EAST FIELD

No.	Sweet Gas Name		Cap.
49	Coltexo	Lefors "77"	30,000
50	Columbian	Lefors "65"	8,500
51	Peerless	Coltexo	3,500

ES, GASOLINE PLANTS, CARBON BLACK PLANTS, COMPRESSOR STATIONS, AND REFINERIES.

Mexico and back into Texas between 1927 and 1932.

There were no new major interstate pipe lines constructed between 1932 and 1941 when the demand for natural gas increased as a result of our country's preparations for national defense and war. During those eight or nine years, however, there were large additions to the original interstate natural gas pipe line facilities, principal among which were:

1. The addition of a 1000-hp. compressor and 12 miles of 18 in. pipe line to the Northern Natural Gas Co.'s system in the Panhandle field in 1936 and 1937.

2. The erection in 1939 by Consolidated Gas Utilities Corp. of a 1600-hp. compressor station at Twitty, Texas.

3. The addition in 1940 of 1650 hp. of compressor units and a dehydrating plant at the Sneed station of the Panhandle Eastern Pipe Line Co., and the erection of a new compressor station at Hansford equipped with compressors having 4280 hp.

In 1941 Texoma Natural Gas Co. built a compressor station and gasoline plant in the Panhandle field and a 26 in. line from that station to connect with its original 24 in. line. In the same year Natural Gas Pipe Line Company of America looped approximately one-half of the length of its system to Chicago with 26 in. pipe. The two companies now have a joint application before the Federal Power Commission covering the installation of a 5000 hp. compressor station in the Panhandle field and 312 miles of 26 in. loop line between the field and Chicago. Those facilities will further in-

crease the capacity of that system to meet the demands of that market area.

Favorable action is expected from the final hearings held in Los Angeles in April before the Federal Power Commission on applications of El Paso Natural, Southern California, and Southern Counties Gas Co. to construct a line to bring gas from sources in the Hugoton and Panhandle gas fields and the oil fields of West Texas and New Mexico to Southern California. If approved, the line would deliver 125 MMcf in its first year of operation, 175 MMcf in its second year, with an anticipated volume within the next five years of 305 MMcf. The El Paso Natural portion of the line from the Jal, N. M., central gathering and treating facilities to Blythe, Calif., will be 26 in., while the line from Blythe to Santa Fe Springs will be 30 in.

The Panhandle Eastern Pipe Line Co. began the construction of additions to their system in 1942. In that year they added 2600 hp. compressor capacity to their Sneed station in the Panhandle field and 1300 hp. to the capacity of their new station in Hansford, Texas. In 1943 they added 3200 more compressor horsepower to the Sneed station and 3200 hp. to the Hansford station. In 1944 they constructed 13 miles of 22 in. pipe line to obtain gas from the gasoline plant of the Phillips Petroleum Co. and added another 1600 hp. of compressor capacity to the Hansford compressor station and constructed 33 miles of 22 in. pipe line looping their system in Texas. The original 24 in. line has now been looped throughout its entire length with 22, 24 and 26 in. pipe. It has also been extended from Indiana to Detroit and other large cities in Michigan.

In 1943 and 1944 Consolidated Gas Utilities Corp. erected a 1950-hp. compressor station in the East Panhandle field.

Northern Natural Gas Co. in 1943 and 1944 added 2000 hp. of compressor capacity to their compressor station in the West Panhandle field.

Table 2. Gas Pipe Line Withdrawals for Light and Fuel During 1945 Pressure Base 14.65 psia

Company	Total for 1945 MCF
Canadian River Gas Co.*	67,185,659
Cities Service Gas Co.	47,987,186
Consolidated Gas Utilities	12,118,535
Dozier Gas Co.	8,075
Hunter	84,284
Lefores Pet. Co. (East & West)	43,164
Lela Gas Co.	2,826
Lone Star Gas Co.	7,881,925
McLean Gas Co.	215,956
Northern Natural Gas Co.	49,372,536
Panhandle Eastern Pipe Line Co.	75,397,857
Producers Utilities	57,633
Public Service Corp.	425,944
Shamrock Gas Co. (H. H. Vaughn)	152,580
Southwestern Public Service Co.	761,845
Spearman Gas Co.	26,967
Sunray Town	37,700
Texoma Natural Gas Co.	78,081,723
Texas Gas and Power	1,561,252
West Texas Gas Co.	12,518,385
Wheeler Gas Co.	41,361
United Gas Pipe Line Co.	7,947,503
Total	361,910,896

*Distributed to Colorado Interstate Pipe Line Co., Texoma Mutual Gas, Amarillo Oil Co., Panhandle Power & Light and U. S. Bureau of Mines Helium Exell plant.

Table 3. Summary of Gas Delivered to Carbon Black Plants during 1945. Pressure Base 14.65 psia

Company	Total for 1945 MCF
Cities Service Oil Co.	3,834,860
Coltexo Corp.	2,171,985
Danciger Oil and Ref. Co.	530,898
Henderson	8,403,300
Huber Pet. Corp.	25,655,140
Magnolia Pet. Co.	15,755,720
Phillips Pet. Co.	128,903,663
Portland Gasoline Co.	4,013,728
Shamrock Oil and Gas Co.	84,869,369
Shell Oil Co.	6,554,613
Skelly Oil Co.	18,960,397
Smith Bros.	5,020,430
Total	304,674,103

Table 4. Summary of Carbon Black Plant Operations for December 1945. Volumes at 14.65 psia

COMPANY	Plant Name	Burning Capacity MCF per day	Process Used	TOTALS FOR DECEMBER Volume Burned MCF	Black Manufactured Carbon	Yield lbs. per MCF	
Borger Area							
United Carbon Co.	Stinnett	15,000	Contact	10,977	15,355	1.40	
United Carbon Co.	Sanford A	16,000	"	13,903	15,532	1.12	
United Carbon Co.	Sanford B	65,000	"	42,810	54,818	1.29	
United Carbon Co.	Rock Creek	60,000	"	43,115	62,326	1.45	
United Carbon Co.	McIlroy	30,000	"	25,756	26,252	1.02	*
United Carbon Co.	Combined	25,000	"	23,719	35,952	1.52	
United Carbon Co.	Alexander	30,000	"	30,611	35,963	1.17	*
Panhandle Carbon Co.	Borger	22,000	"	19,295	28,214	1.46	
Phillips Pet. Co.	Philblack	.....	Furnace	.....‡	155,300	....	
Huber Pet. Corp.	Borger	95,000	Contact	67,827	138,984	2.05	
Huber Pet. Corp.	Borger	12,000	Furnace	5,270	38,219	7.25	
Crescent Carbon Co.	Borger	10,000	Contact	9,286	13,452	1.45	
Columbian Carbon Co.	Wescar 52	69,000	"	54,178	70,465	1.30	*
Columbian Carbon Co.	Wescar 51	18,000	"	16,883	24,597	1.46	
Pampa Area							
Texas Elf Carbon Co.	Bowers	60,000	Contact	56,678	80,754	1.42	
Peerless Carbon Co.	Coltexo	4,000	"	3,603	1,560	0.43	†
Columbian Carbon Co.	Lefores 65	8,500	"	6,344	8,871	1.40	
Columbian Carbon Co.	Kingsmill 60	12,000	"	10,130	16,887	1.67	
General Atlas Carbon Co.	Pampa	6,000	Furnace	6,973	79,419	11.45	
Cabot Carbon Co.	Kingsmill	30,000	Contact	9,286	13,452	1.45	
Cabot Carbon Co.	Shafer	50,000	"	45,043	55,500	1.23	*
Carbon Blacks Inc.	Lefores	450	"	242	76	0.31	†
Coltexo Corp.	Lefores 77	30,000	"	26,220	45,676	1.74	
Moore County Area							
Cabot Carbon Co.	Armstrong	30,000	"	20,609	27,204	1.32	
Columbian-Phillips	Cophil	15,000	"	15,129	24,177	1.60	
Columbian Carbon Co.	Sunray 59	85,000	"	86,016	121,268	1.41	
Continental Carbon Co.	Sunray	75,000	"	72,041	97,099	1.34	
Continental Carbon Co.	Sunray	6,000	Furnace	8,227	66,212	8.08	
Continental Carbon Co.	Sunray DPC	40,000	Contact	40,807	58,303	1.43	
Crown Carbon Co.	Sunray	18,000	"	14,521	19,744	1.36	
Moore County Carbon Co.	Moore Co.	33,000	"	26,217	31,750	1.21	
United Carbon Co.	Reliance	40,000	"	29,052	35,919	1.24	
		1,009,950		860,148	1,529,561	1.598§	

*Manufactures some color black.
†All color black.
‡No gas used in process—Product is called chemical black rather than carbon black.
§Excludes chemical black.

CARBON BLACK PRICES:
(1) Contact or Channel—5c/lb bulk and 5¼c/lb in bags. OPA Price.
(2) Furnace—3½c/lb for Semi Reinforcing (SRF) and 5c/lb for high Modulus (HMF) going prices.
(3) Color blacks (ink & paints) vary from 4c to $1.50/lb.

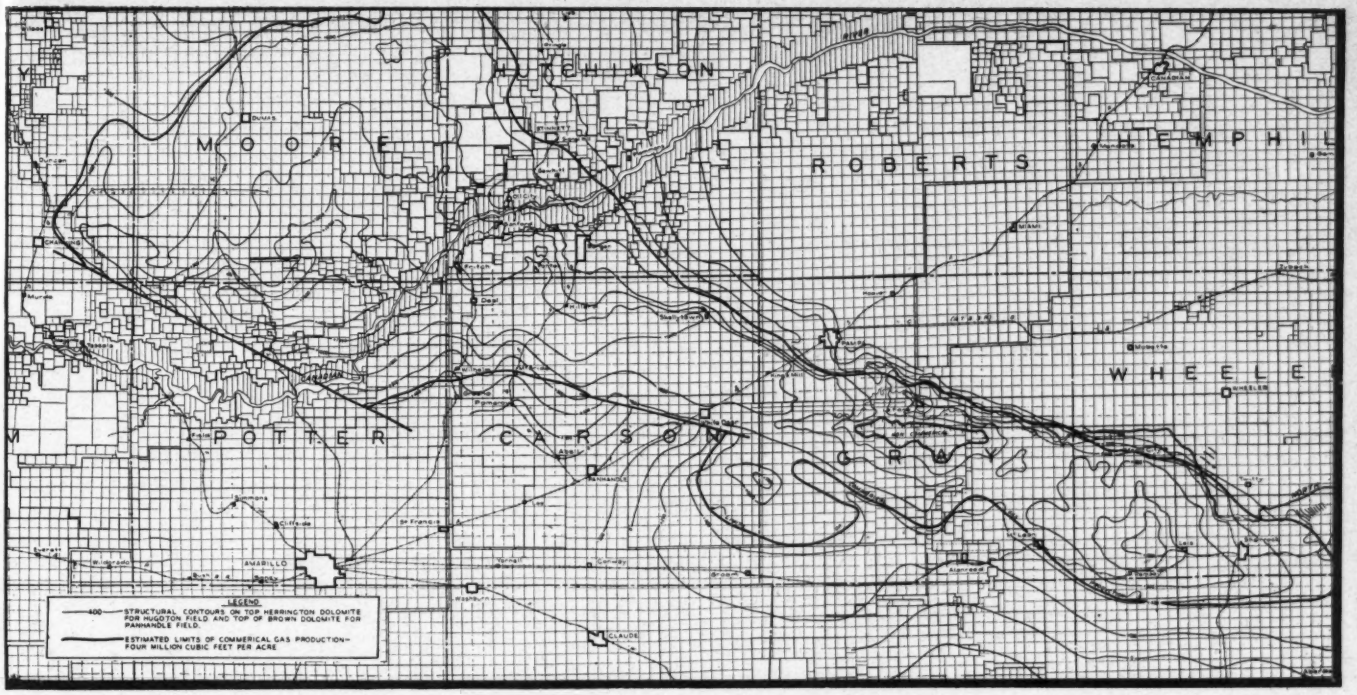


FIG. 2. Structural map of the Panhandle Field.

Regulation by Railroad Commission

The Panhandle Field is regulated by the Railroad Commission of Texas through its Oil and Gas Division office in the City Hall at Pampa. The gas area is divided into three parts: West Sweet, East Sweet, and West Sour.

An examination of the March 1, 1946, gas proration schedule for the West Sour Field shows the proration basis to be two-thirds allocation to the product of the acreage containing the well by observed pressure at the well, and one-third of the allocation to the potential of the well. The total acreage shown was 276,754, the number of wells 592, and the total potential 15,249,638 Mcf. The total daily allocation is 750,000 Mcf. No proration schedules are issued for the West Sweet and East Sweet Zones.

The January, 1946 Monthly Summary of Natural Gasoline Plants shows data on 41 plants. A total of 1485 dry gas wells and 4435 casinghead gas wells are connected to the plants. A total of 1,572,606 gals. of gasoline was recovered with a recovery of .684 gals. per Mcf. Over 48% of the residue gas was utilized for pipe line lighting fuel purposes and 40% utilized by carbon black plants. Only 18/100 of 1% of the residue gas was vented to the atmosphere. The 32 carbon black plants produced 1,385,050 lb. with a recovery of 1.61 lb. per Mcf.

The January report also showed a total of 1951 producing gas wells which produced 1,525,245 Mcf of sweet gas and 772,546 Mcf of sour gas. The report showed 343 gas wells in the East Sweet field produced 4,708,258 Mcf and 1043 gas wells in the West Sweet field produced 42,574,323 Mcf. In the West Sour field, 565 gas wells produced 23,948,930 Mcf. The 1951 producing wells produced a total of 71,231,511 Mcf or a daily average of nearly 2.3 billion cu. ft.

TABLE 5. ACREAGE BY PRINCIPAL COMPANIES SUPPORTING GAS PIPE LINE REQUIREMENTS

Companies	*Acres*
Canadian River Gas Co.	232,000
Texoma Natural Gas Co.	154,000
Cities Service Gas Co.	89,000
Northern Natural Gas Co.	76,000
Panhandle Eastern Pipe Line Co.	67,000
Lone Star Gas Co.	22,500
West Texas Gas Co.	11,000
United Gas Co.	9,500
Consolidated Gas Utilities Corporation	8,500

TABLE 6. CLASSIFICATION OF ACREAGE BY PRINCIPAL COMPANIES SUPPORTING MARKETS OTHER THAN PIPE LINE REQUIREMENTS

Companies	*Acres*
Phillips Petroleum Co.	340,000
Shamrock Oil & Gas Co.	79,000
Huber	47,000
Skelly Oil Co.	18,000
Magnolia Petroleum Co.	12,000
F. C. Henderson	9,000

Note: Most of these markets are residue gas for carbon black manufacture and local industrial and field uses. Phillips Petroleum Co. sells 60 MMcf per day to Panhandle Eastern from Sneed gasoline plant and 34 MMcf per day to Northern Natural Gas Co. from the Gray gasoline plant.

Gas Waste Problem

With the discovery in early 1926 of the prolific Borger pool, gas wastage problems arose when large volumes of gas were found in the Dolomite Horizon overlying the oil bearing Moore County Lime formation. A large number of operators followed a short-sighted policy by completing their oil wells in such a manner that large quantities of gas were produced from the upper gas horizon. With the decline of oil production from these wells, gas-oil ratios reached fantastic proportions and one well produced 27 MMcf of gas with one barrel of oil.

Natural gasoline plants were attracted early to the area by the tremendous gas volumes and the first plant was built in 1926. By January 1, 1937, 43 gasoline plants were in operation.

TABLE 7. PANHANDLE COMPOSITE GAS ANALYSIS

Oxygen	.2%
Carbon dioxide	.2
Ethane	18.7
Methane	73.1
Residue	7.8
	100.0%

Heating Value (Btu.)—About 1040

Present gas prices (April, 1946) are approximately 4½c per Mcf for dry natural gas and 1¼c per Mcf for gas used in carbon black plants.

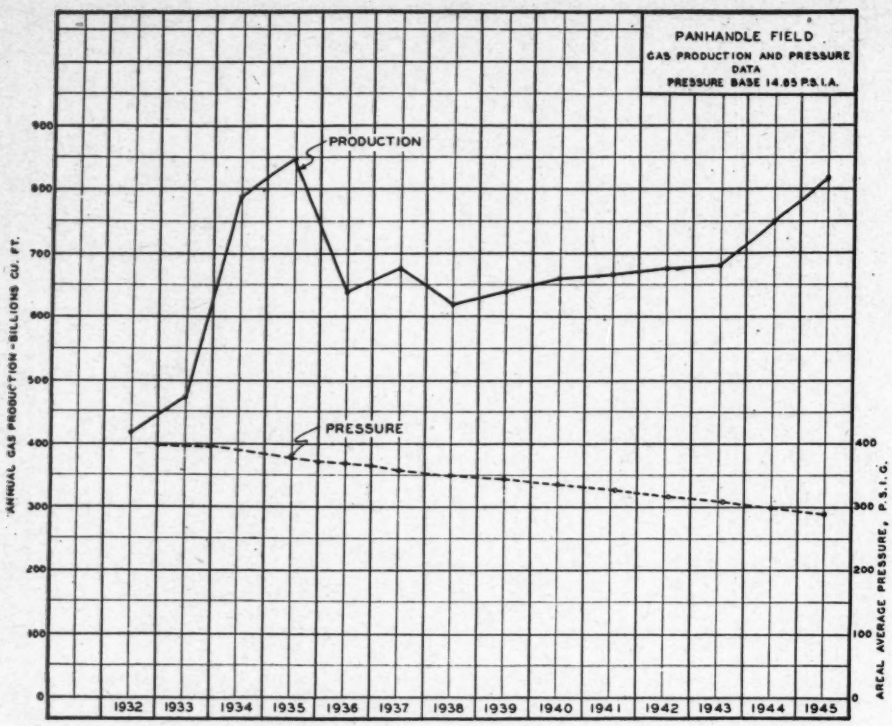


FIG. 3. Panhandle Field, gas production and pressure data.

With the tremendous volumes of unmarketable residue gas available from early-day gasoline plants, the carbon black industry was soon attracted to the Panhandle, and the first carbon black plant began operations in 1927. By the latter part of 1936 about 30 plants, about 75% of the world's production at that time, were in operation. Fig. 4 shows the part the Panhandle field has played in carbon black production. Table 3 gives deliveries of gas to carbon black plants in 1945. Table 4 summarizes carbon black plant operation for December, 1945.

The advent of long distance pipe lines did not help the owners of unconnected gas wells as the pipe line owners had abundant gas supplies of their own during the depression period. The sour gas well owners were likewise in a predicament for markets.

The Texas legislature took cognizance of the problems in 1931 in the passage of the "Common Purchaser Act." The first Railroad Commission order under this Act was declared invalid by the courts upon the grounds of unconstitutionality. The Railroad Commission's "Shut Down Order", designed to share markets, met a similar fate.

In 1932, after the passage of another statute to prorate gas production to market demand, the Commission again was prohibited by the courts to proceed.

The Commission started the practice of issuing permits for stripping gasoline content from gas production which increased the wastage problem.

The so-called "Sour Gas Law" was passed in 1933. It had the effect of allowing the construction of more and larger stripping plants which increased the wastage of residue gas to over a billion cu. ft. per day.

In May, 1935, the Texas Legislature passed House Bill 266 which has been termed as one of the most comprehensive gas conservation statutes. On Aug. 1, 1935, the law became effective as to sweet gas and as to sour gas on Oct. 1, 1935. The law was attacked and was upheld by the U. S. Supreme Court.

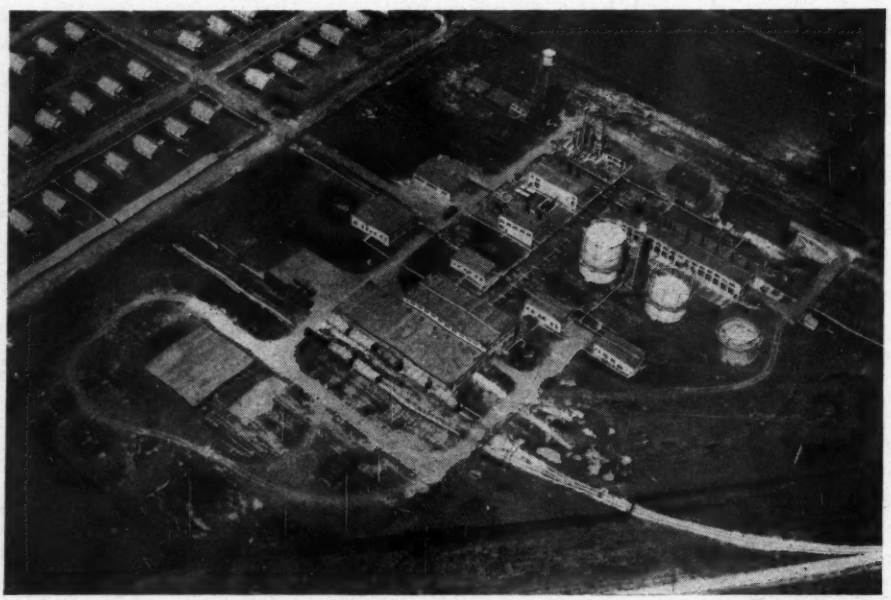
Senate Bill 407, approved by the governor on May 20, 1937, pertained to gasoline plant operations and sour gas production.

Gas wastage at present is only about 25 million cu. ft. per day and represents gas that cannot be handled economically.

House Bill 266 contains a provision which empowered the Commission to zone a field or reservoir into separate proration units. The field was separated into two fields for the reason that the leasehold and fee ownerships are divided into small tracts in the eastern part of the field, while the leasehold and fee ownerships are generally much larger in size in the western portion. The markets for the two areas are also different.

Natural Gasoline Pipe Lines

The Mex-Tex 8 in. pipe line gathers natural gasoline from many of the West Texas fields and delivers the unstabilized product to the Borger fractionating facilities of the Phillips Petroleum Co. From its Hobbs terminus the line extends 285 miles to Borger. Under present conditions the line's operating capacity is approximately 15,000 bbl. per day. In 1931 the Phillips Petroleum Co. constructed a products line from Borger through Wichita, Kan., and Kansas City to E. St. Louis. The line was later extended to the Chicago area. Between Borger and Wichita, 75 miles of 12 in. loops will be installed this spring.



Air view of the Exell helium plant of the Bureau of Mines.

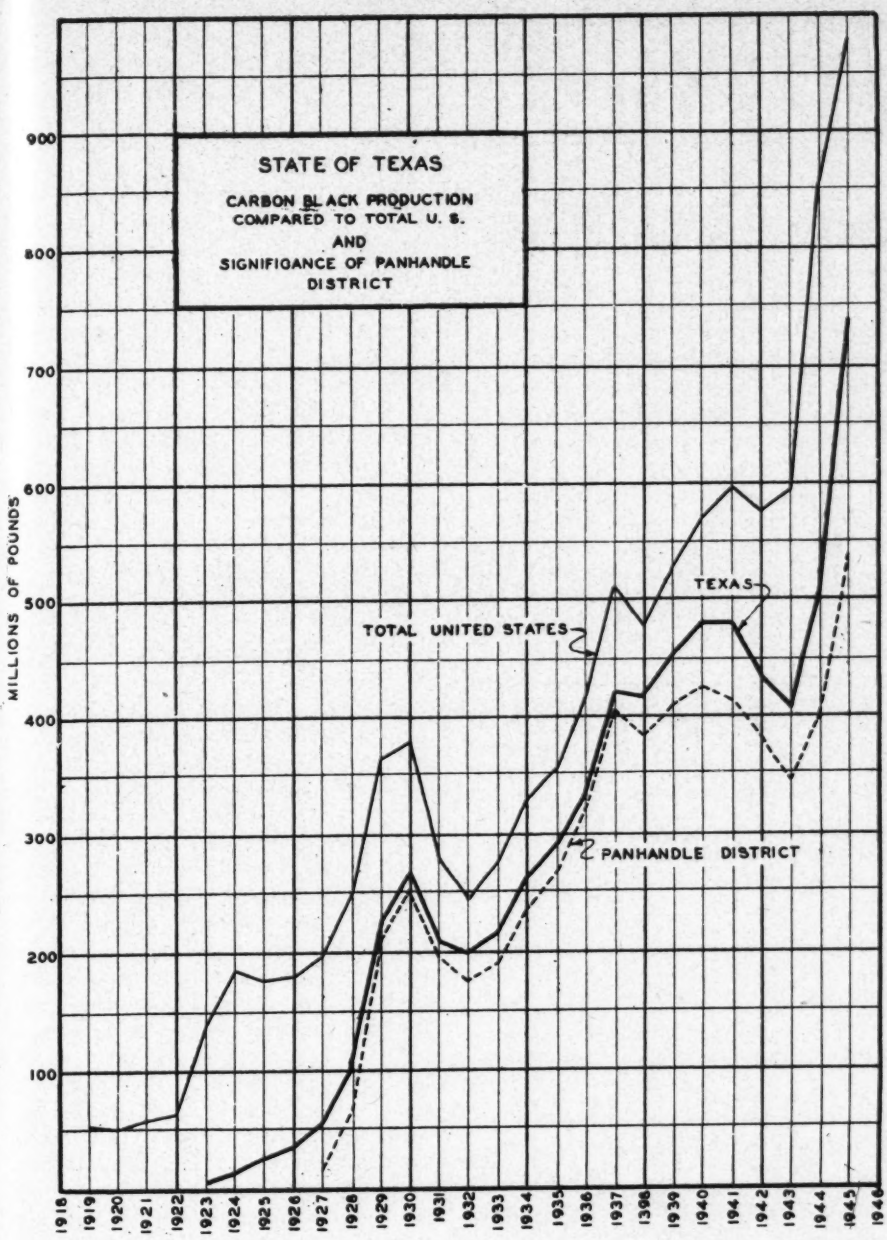


FIG. 4. Carbon black production compared to total U.S. and significance of Panhandle district.

Helium

The Exell helium plant of the Bureau of Mines is located in the southern Moore County portion of the field. The first Bureau of Mines helium plant was put into operation in 1929 at Amarillo. Until the beginning of 1941 this plant was responsible for the production of 99.99 million cu. ft. of helium. Excess helium is compressed and forced through a 32-mile enameled 2-in. pipe line from the Exell plant to the 50,000 acre Seacliff field near Amarillo and injected into one of the 11 wells in the field for storage.

As of March 25, 1946, a total of 21 wells were being drilled in the field. Since the inception of PAW regulations, all gas wells have been drilled on 640-acre spacing. One operator in the field uses portable rotary mast drilling rigs which move in, set up, and complete wells in 15 to 16 days. Only six or seven drilling bits are required. Little difficulty is encountered with the exception of cases of lost circulation. As a general rule, wells are acidized to increase productivity.

Gas Repressuring Program in West Pampa Oil Pool, Gray County

A cooperative agreement among 26 companies, covering 950 oil wells on 11,500 productive acres, was executed to cover joint activities for a gas repressuring operation in the West Pampa oil pool. The project is expected to increase oil recovery about 40 million barrels above primary production methods.

Future Developments

Areas in Collingsworth County and the southern portion of Gray County exhibit possibilities of field extensions. The Panhandle and Hugoton fields are separate from the standpoint of the limits of commercial gas production. They are separated by a narrow area that does not yield commercial gas wells at prevailing gas prices. The Panhandle field is practically defined on all sides by dry holes and small wells.

In 1945, several carbon black plants were constructed or rehabilitated to handle the wartime demands. The Continental Carbon Co. and the Defense Plant Corporation built a channel black plant at Sunray. The Cabot Carbon Co. rehabilitated their channel plants at Pampa and Skellytown.

The Reconstruction Finance Corporation Plains Butadiene plant, built in 1943, is currently producing at the rate of 45,000 short tons per year of butadiene. The adjoining B. F. Goodrich Copolymer rubber plant, 45,000 long tons capacity, uses the butadiene. The plants are located about three miles west of Borger.

The Phillips Petroleum Co. manufactures in the field a chemical black called "Philblack", made from degraded refined oil. The plant is the only one of its kind in the world. A tremendous amount of research is under way regarding the future possibilities of this chemical black, as well as furnace black. With the possibility that natural gas supplies for carbon black will be limited in the future, the natural gas industry will be greatly affected by future developments.

Fifty per cent of total carbon black is made by the furnace process which makes 7 to 10 times as much carbon black per Mcf as the channel process. Research now in progress on such blacks and rubber compounding shows good possibilities that the requirements of natural gas in carbon black manufacture may greatly diminish in the future.

FPC Approves Wisconsin Accounting Adjustments

The FPC has approved proposals by Wisconsin Electric Power Co., Milwaukee, to make accounting adjustments involving the elimination of $2,143,848 representing remaining excess of acquisition costs over original cost of acquired properties, write-ups reflected in plant accounts through recording appraisals, and other excesses of recorded cost over original cost.

The elimination is to be effected through (1) a charge of $461,380 to Reserve for depreciation of electric plant, (2) a charge of 21,524 to Earned Surplus, and (3) a charge of $1,660,944 to Capital Surplus.

ASSOCIATIONS

Cooperation Keynotes GAMA Meet

NEW problems confronting the gas appliance and equipment industry and the relations existing between appliance manufacturers and the gas utilities held the spotlight at the 11th annual meeting of the Gas Appliance Manufacturers Association in Chicago, June 11 and 12.

Retiring President Lyle C. Harvey sounded a keynote of increasing manufacturer independence as he reported on his two years' stewardship and volunteered some recommended points for future guidance of GAMA. Harvey foresees a period in the very near future when the gas appliance industry "must work together or face more ruinous competition than it has ever know in the past."

He apprised the members of the suggestions and advice that he, as president of GAMA, has been giving to utility groups. He has told them not to put too much emphasis on price; to encourage manufacturers who work toward the advancement of both utility and appliance standing by building quality appliances.

There is a need, in Harvey's opinion, for greater uniformity in appliance specifications, and the manufacturing industry would benefit greatly by any relaxation of the excessive demands that individual gas companies make for minor variations to suit local conditions. Particularly, he emphasized that special requirements should not be made a subject of A.G.A. testing laboratory approval standards.

Competition Best Stimulus

"The utilities should recognize," he said, "the harmful effect of any requirements that go above and beyond safety." Competition, in the speaker's' opinion, will do more to insure a steady trend toward perfection in gas appliances than will any mandatory edict passed down by some central authority.

Many gas appliance manufacturers feel that the utilities have been remiss in their attention to the quality and pressure of gas supplied. "What we need," said Harvey, "is 110-volt, 60-cycle gas." To the American Gas Association he suggested that provisions be made to admit liquefied petroleum gas operators into its membership. It should inaugurate a comprehensive market research and sales analysis investigation for the whole gas industry. The successful exploitation of the gas market will depend on factors that are at present not even known to the great majority of the gas industry. "Can the industry only partially promote its fuel and expect to retain leadership?"

His recommendations and suggestions to GAMA were equally specific:

(1) There should be a concerted industry attitude toward the OPA and remaining governmental controls.

(2) Gas appliance manufacturers should aspire to handle all their association business through GAMA, and "too many associations are collecting dues from GAMA members."

(3) Every effort should be made to achieve a spirit of closer cooperation with the A.G.A., but with the appliance industry retaining jurisdiction over its own affairs so far as appliance design is concerned.

(4) There is a need of more detailed and reliable statistical information on the appliance industry. Subjects within the range of possible statistical coverage include production figures, trends in the volume of unfilled orders, wages and conditions of employment in the industry. "Sooner or later somebody will collect figures on our industry. It may be GAMA or it may be some government agency."

(5) There is need for a superior promotion effort in the sale of gas appliances. The output of appliances promises to exceed the normal market demand at an early date, once materials become available. GAMA must do a promotion job on the sale of gas appliances to match the effort now being promulgated by the gas utilities. Protecting the market for gas appliances means doing a volume job, which in turn presupposes effective retailing at the point of sale. There is need for a sound industry position with respect to utility and dealer merchandising programs.

The whole of President Harvey"s talk reflected the willingness and desire of appliance manufacturers to cooperate with utilities for the advancement of the appliance industry, but at no further sacrifice of their own independence in matters of appliance design and distribution procedures.

E. J. Boothby, president of the A.G.A., and H. Carl Wolf, its managing director, both discussed the promotion, research and advertising that the utilities are financing, President Boothby stressing the necessity for manufacturers' delivering new and improved appliances and equipment high in quality and appeal, to hold the popularity of gas against competitive fuels. Carl Wolf agreed with GAMA President Harvey on the necessity of determining the extent and nature of public demand for various types of gas appliances. Commenting on the fact that GAMA has withdrawn its support from the A.G.A. advertising program, he said that if the appliance association plans to spend immediately the amount formerly subscribed on some better promotion of its own, the loss would not be serious to the industry. But in his opinion, now is the time when this must be done if it is to achieve any results in the immediate postwar market. Wolf also believes that the industry must encourage dealer activity in order to achieve the most widespread cultivation of gas appliance prospects.

Other Reports

Other reports in general session included H. Leigh Whitelaw's report as managing director, in which he announced that the membership has grown from October, 1944, when it totaled 258, to present all-time high of over 400. Harold Massey, assistant managing director, explained the actual mechanics whereby laboratory requirements are tested and developed into new standards. John Van Norden, treasurer, reported the association in the best fiscal position in its history.

Other general sessions speakers included Gordon Rieley with some practical suggestions as to how the industry can get along with OPA during its expiring days; Louis Ruthenburg, who suggested two steps whereby the present system of collective coercion in labor relations can again be elevated to the status of collective bargaining. The suggestions were: 1) revise the Wagner Act so as to recreate a concept in which employers and employees enjoy equality under the law; 2) remove from labor organizations all special privileges and immunities.

Kenneth W. Rugh of the Phillips Petroleum Co., an expert on liquefied petroleum gas, presented new figures on the startling growth of butane and propane. Rugh estimates that the industry now has between 2000 and 2500 bulk stations, 15,000 retail outlets, and well over 2 million domestic gas consumers. He prophesied that new installations of between 750,000 and 1 million would be made during the first normal year of supply availability. The supplies of both butane and propane are ample and the potential output of the industry is far in excess of any presently foreseeable

(Please turn to Page 56)

WARD PRECISION ENGINEERING MEANS

No "Service Problems" FOR DEALERS

Comebacks and complaints, requiring extra service calls—are virtually unknown with Ward dealers. The reason. Ward builds floor furnaces *exclusively*—to highest precision standards, then puts them to the most rigid tests before final approval for shipment.

This reputation for "trouble-free operation" has been a big factor in building the Ward reputation. In every area where it is sold Ward is considered the standard of quality among floor furnaces.

For the present—shipments will continue to be limited to our long-established dealers. However, we are "stepping up" our production schedule—and are looking forward to the day when we can offer additional dealers the sales advantages of Ward Floor Furnaces.

WARD HEATER COMPANY

1800 W. WASHINGTON BLVD., LOS ANGELES 7, CALIF.

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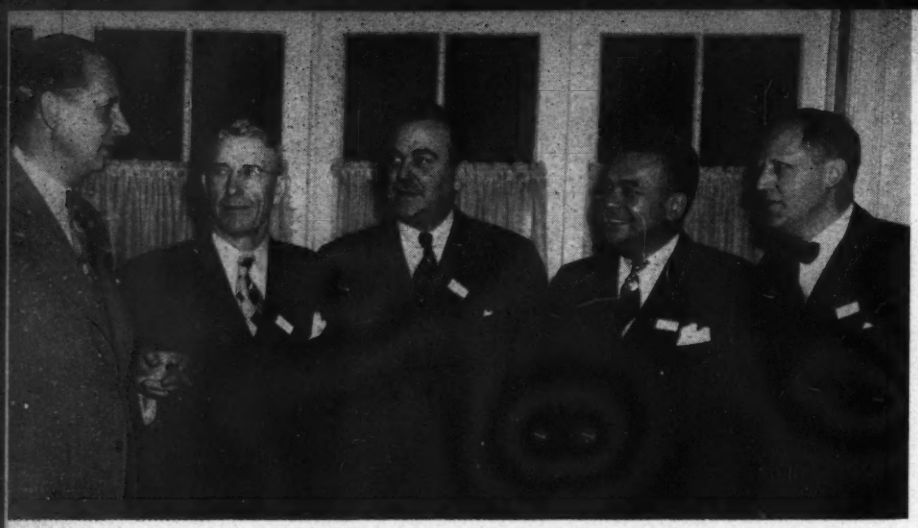
37 YEARS OF "KNOW-HOW"



GAMA CONVENTION

June 11-12, 1946

Drake Hotel, Chicago

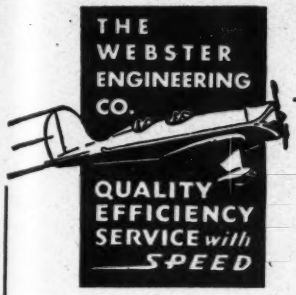
Left to right: Lyle C. Harvey, pres., GAMA and Bryant Heater Co., Cleveland; D. P. O'Keefe, pres., O'Keefe & Merritt, Los Angeles, pres.-elect GAMA; John A. Robertshaw, pres., Robertshaw Thermostat Co., Youngwood, Pa., and second vice pres. GAMA; Frank J. Hoenigmann, vice-pres., Florence Stove Co., Chicago, GAMA second vice pres.-elect; John Van Norden, secy., American Meter Co., New York, GAMA treas.

Harold Massey, at left, assistant managing director, GAMA, and H. Leigh Whitelaw, managing director, GAMA, both of New York City.

H. Carl Wolf., A.G.A. managing director; E. Carl Sorby, vice pres., George D. Roper Corp., Rockford, Ill; Gordon Rieley, vice pres., Bryant Heater Co.; A.G.A. Pres. E. J. Boothly.

K. W. Rugh, asst. mgr., chemical products dept., Phillips Petroleum, Bartlesville, Okla.; K. G. Fuller, mgr., market research, U.S. Steel Corp., Pittsburgh.

Louis Ruthenburg, president, Servel, Inc., Evansville, Ind.; R. L. O'Brien, president, Detroit Brass & Malleable Works, and George S. Jones, Jr., vice president, Servel.



Consulting Engineers and Manufacturers of Gas Combustion and Control Equipment . . .

More than 18 years experience in designing and building combustion equipment for industrial power and heating boilers, enables us to recommend the proper equipment for these installations. Our manufacturing facilities permit us to furnish this equipment on schedule.

Webster engineers are thoroughly capable of helping you solve your combustion problems, to modernize present equipment and to design special equipment to meet special conditions.

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Consult Webster First—

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Division of **SURFACE COMBUSTION . . . . . Toledo, Ohio**

Representatives— CATLETT ENGINEERS, Inc., Dallas • F. J. EVANS ENGINEERING CO., Birmingham, Houston
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SURFACE COMBUSTION, Chicago, Denver, Pittsburgh • OIL FIELD EQUIPMENT CO., New York
ECONOMY EQUIPMENT CO., Kansas City, Kan., & St. Louis • FEDERAL SUPPLY CO., Oklahoma City
• E. A. BROWN COMPANY, Omaha, Neb.

demand. He advised appliance manufacturers to be prepared to develop new policies and practices, where necessary, to conform to liquefied gas merchandising standards. He ventured the opinion that there should be separate advertising and promotion, based on rural retailing, problems, rather than on city utility experiences.

Many divisional and group meetings occupied the attention of the delegates during the afternoons of both days. Technical as well as policy problems were debated and will be made the subject of specific recommendations to the directors of GAMA.

New officers elected for the ensuing year were: president, D. P. O'Keefe, president of O'Keefe and Merritt Co., Los Angeles; first vice president, John A. Robertshaw, president of the Robertshaw Thermostat Co., Youngwood, Pa.; second vice president, Frank J. Hoenigmann, vice president of Florence Stove Co., Chicago; treasurer, John Van Norden, secretary of the American Meter Co., New York.

A.G.A. Holds Southwest Meeting in Fort Worth

Job training, supervisory training, shift differentials, unionization activities, and the Case Bill were aired at the 13th annual meeting of the A.G.A. Southwest Personnel Conference, which met in Fort Worth, Texas, on June 4.

V. H. Luneborg, secretary of the conference, told members they would shortly receive questionnaires regarding plans for the joint meeting with the Midwest group to be held in the fall. Fred R. Rauch, chairman of the A.G.A. personnel committee, called attention to the general session at the Atlantic City convention, and invited all members to attend the personnel committee meetings in New York and in Cincinnati.

CALENDAR

September

Sixth Annual Appalachian Gas Measurement Short Course—West Virginia University, Morgantown, W. Va., Sept. 9-11.

Pacific Coast Gas Association Convention—Fairmont Hotel, San Francisco, Sept. 10-12.

October

American Gas Association Annual Convention and Exhibit—Atlantic City, N. J., Oct. 7-11.

November

National Hotel Exposition—Grand Central Palace, New York City, Nov. 11-15.

National Metal Congress and Exposition—Atlantic City, Nov. 18-22.

December

National Exposition of Power and Mechanical Engineering, Grand Central Palace, N. Y., Dec. 2-6.

Liquefied Petroleum Gas Holds Spotlight at Production and Chemical Conference

HIGHLIGHTED by a complete and exhaustive symposium on liquefied petroleum gas, the 1946 Joint Production and Chemical Conference held under the auspices of the Technical Section of the American Gas Association, June 3 to 5, in New York, was widely regarded as the most valuable meeting of its kind in recent years.

Chemical conferences of the past have generally revolved around the problems of the manufactured gas industry, with particular emphasis on the technique of gas making, the refinement and uses for the incidental chemical by-products. These traditional concerns of gas makers, however, have since the war taken second place to the urgent necessity of lowering the cost of manufactured gas through the discovery and utilization of possible peak-shaving schemes. Much of the time of the three-day production and chemical meeting, therefore, which was not devoted to consideration of the problems involved in liquefied gases, was spent on examining the problems of gas production research.

Dr. C. W. Wilson of Baltimore, chairman of the Chemical Committee, opened the first session, at which E. J. Boothby, A.G.A. president, and H. Carl Wolf, its managing director, spoke briefly. Evaluation of enriching oils was considered in a paper by S. P. Cauley of Socony-Vacuum Oil Co., New York. Coal production and preparation for the market was discussed by H. F. Hebley of the Pittsburgh Coal Co. High grade gas coal is becoming increasingly scarce, and the speaker warned the industry that it must prepare to adjust its gas making operations to coal with higher percentages of organic and sulphate sulphur and other impurities.

Two reports, one on water gas set capacity by F. W. Hartzel of Philadelphia, and the other dealing with tar dehydration by J. G. Sweeney of Brooklyn, completed the opening session.

Benefits of Propane

A variety of ways in which liquefied petroleum gas, notably propane, can be used to solve the peak problems of the manufactured gas industry were discussed at length in the gas symposium. R. E. Schneiter of New York detailed the work that is being planned by his company, Consolidated Edison of New York, Inc., in connection with its newly installed 10 MMcf per day capacity propane-air plant. In addition to increasing the peak load send-out by the amount of propane-air that can be practically incorporated in the normal output, this company is planning further study in the use of liquefied petroleum gases through reforming cold enrichment of low Btu gases. The Consolidated Edison Co. is doing extensive laboratory work to determine the character and amount of modified gases that can be intermittently introduced into the system without adjusting consumers' appliances.

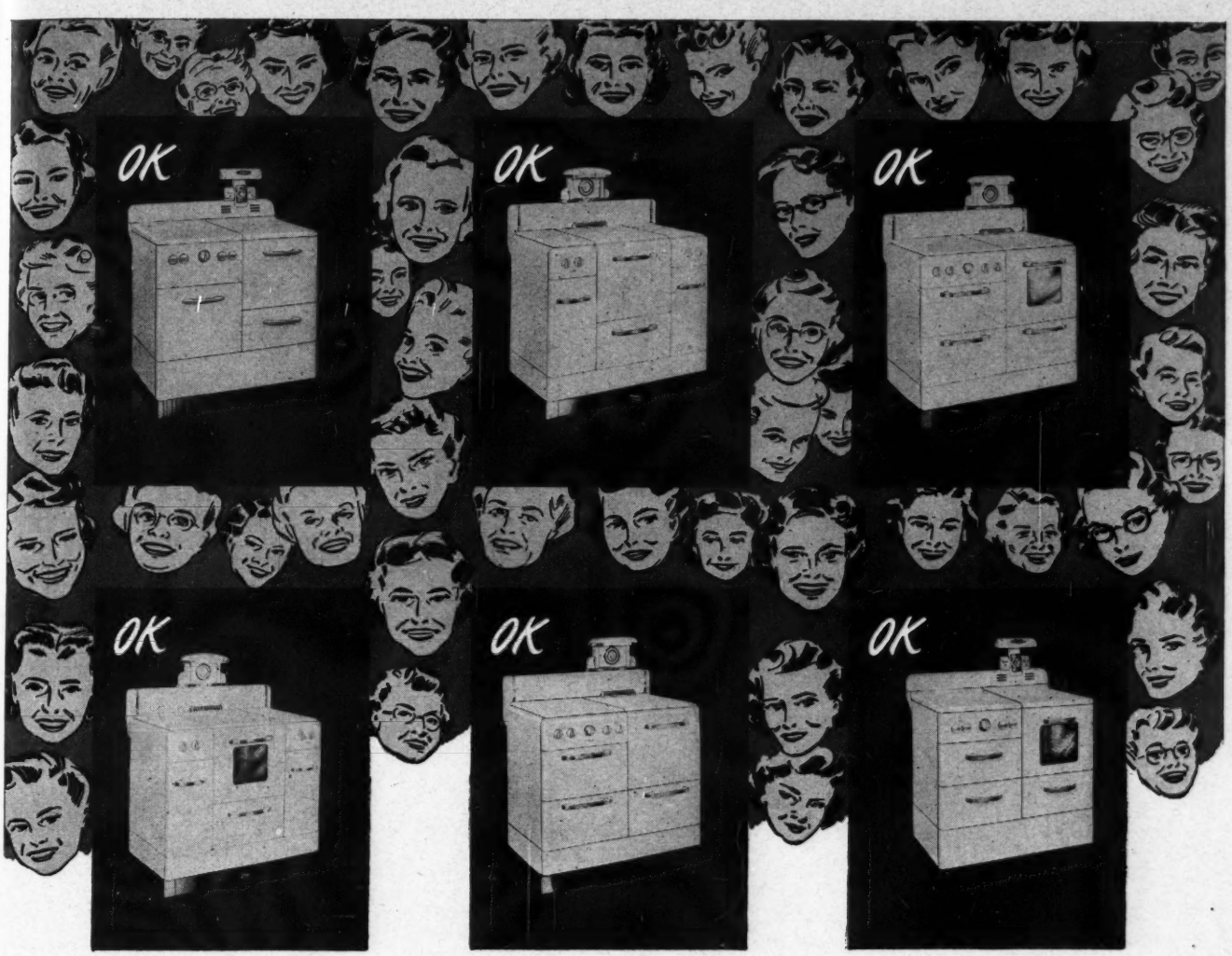
The experience of the Citizen's Gas and Coke Utility in Indianapolis with propane was presented by B. P. Mulcahy. This plant has been operating for three years using undiluted propane for cold enrichment of water gas. He also described experience incidental to underfiring coke oven batteries with 600-Btu propane-air. His conclusion: "Propane equipment is very flexible, easy to handle, and offers very little difficulty."

Butane Installation Described

The liquefied petroleum installation at the West Conshohocken plant of the Philadelphia Electric Co. was described by E. G. Boyer, who presented charts and data accumulated in this operation. The plant to date has used only butane, but the equipment has been designed so that either butane or propane may be used. The company is testing appliance performance on a laboratory scale, to provide data for use next winter when it is estimated the send-out specific gravity on maximum days will be between 8000 and 12000 Mcf.

The status of all the research projects now going forward under the aegis of the A.G.A. Gas Production Research Committee was made available to the convention in the form of a printed report supplied by P. T. Dashiell, chairman of the committee and vice president of the Philadelphia Gas Works, Philadelphia, Pa. The 21 projects are in various stages of advancement, ranging from proposed to those completed.

Given more detailed treatment was organic sulphur, by Dr. E. W. Guernsey, Baltimore, and H. Hakewill and E. M. Rueck of the Institute of Gas Technology in Chicago. The presentation concerned itself almost entirely with the development of laboratory techniques and the design of apparatus to analyze the organic sulphur compounds in manufactured gas.



"Okayed" by Hundreds of Thousands of women

THE demand for Florence Gas Ranges has been created by hundreds of thousands of satisfied housewives. Seventy-four years of manufacturing experience, plus a policy of exhaustive testing and research have made Florence a name synonymous with top performance. Ever-conscious of consumer demands and needs, we have incorporated into our gas ranges features that make them practicable and dependable.

Despite all the production "headaches" we face today there has been no compromise with the traditional Florence quality. The performance and per-dollar value of Florence Gas Ranges are as high as ever. Because of this rigid standard of uniform quality and the unprecedented production "hold-ups" it has been necessary to allocate merchandise to you Florence dealers.

However, you can be sure that all the Florence gas ranges you receive—and sell—will receive the enthusiastic "Okay" of women and help to build more satisfied customers for you.

FLORENCE STOVE COMPANY... General Sales Offices and Plant: Gardner, Mass. Western Sales Offices and Plant: Kankakee, Ill. Southern Plant: Lewisburg, Tenn. Other Sales Offices: One Park Ave., N. Y.; 1459 Merchandise Mart, Chicago; 53 Alabama St., S. W., Atlanta; 301 No. Market St., Dallas.

FLORENCE
Gas Ranges

Gas Companies Win 20 National Awards in "Better Copy" Advertising Contest

SIXTEEN gas utilities were awarded 20 national awards in the "better copy contest," sponsored by the Public Utilities Advertising Association, and recently concluded. Announcement of the winners was made at the association's two-day convention in Atlantic City, N.J., last month.

Southern California Gas Co. and Southern Counties Gas Co., jointly led the list of winners, with a combined total of four awards. The Cincinnati Gas & Electric Co. was a double winner.

The Los Angeles companies scored in the following categories: 1) Class 2, series of five or more advertisements, for gas companies; 2) Class 5, single newspaper advertisement promoting the use of gas service; 3) Class 12, outdoor advertising, open to all utilities; and 4) Class 15, all-utility competition for motion picture advertising.

This year's edition of the annual contest was divided into three groups —Group A, utilities with less than 100,000 customers; Group B, 100,000 to 400,000; and Group C, those having more than 400,000 customers.

In addition to the 40 national awards presented, 78 honorable mentions were made. Advertising entries were judged under 16 classifications, as follows:

(1) For electric companies: series of five or more newspaper advertisements.
(2) For gas companies: Series of five or more newspaper advertisements.
(3) For all utility companies: single newspaper advertisement to maintain public approval of utility.
(4) For electric companies: single newspaper advertisement promoting the use of electric service.
(5) For gas companies: single newspaper advertisement promoting the use of gas service.
(6) For transportation companies: single newspaper advertisement on any subject.
(7) For all utility companies: employee publications.
(8) For all utility companies: bill enclosures, postcard billing cards, other periodicals for residential customers.
(9) For all utility companies: Special booklets, pamphlets and circulars.
(10) For all utility companies: window display.
(11) For all utility companies: inside display.
(12) For all utility companies: Outdoor advertising.
(13) For all utility companies: annual report to stockholders.
(14) For all utility companies: annual report to employees.
(15) For all utility companies: motion pictures.
(16) For all utility companies: radio advertising.

NATIONAL AWARD WINNERS

Group A

Houston Natural Gas Corp., Houston, Texas—Class 10
Kansas Gas & Electric Corp., Wichita, Kan.—Class 13
Mississippi Power & Light Co., Jackson, Miss.—Class 7
Montana Power Co., Butte, Mont.—Class 12
Northampton Gas Light Co., Northampton, Mass.—Class 5
Superior Water, Light & Power Co., Superior, Wis.—Class 2

Group B

Cincinnati Gas & Electric Co., Cincinnati, Ohio—Class 3, Class 10
Citizen's Gas & Coke Utility, Indianapolis, Ind.—Class 7
New Orleans Public Service, Inc., New Orleans, La.—Class 12
Portland Gas & Coke Co., Portland, Ore.—Class 6

Group C

Brooklyn Union Gas Co., Brooklyn, N.Y.—Class 8
Consolidated Edison Co., New York—Class 3
Consumer's Power Co., Jackson, Mich.—Class 10
Iowa Utilities Association, Cedar Rapids, Iowa—Class 9
Michigan Consolidated Gas Co., Detroit—Class 7
Southern California Gas Co. and Southern Counties Gas Co., Los Angeles—Class 2, Class 5, Class 12, Class 15

Dependence of Farmer On Gas Industry Emphasized

The dependence of agriculture on the oil and gas industries was emphasized by Dr. Gustav Egloff, Universal Oil Products Co., Chicago, in a paper delivered before the second Southwest Chemurgic Clinic at Oklahoma City, Okla., June 3-5.

Among the many contributions made by the petroleum industry to the farm are natural and liquefied gases for heating and lighting, he pointed out.

"Oil and gas are used to heat water and generate steam for washing and sterilizing churns, pails, bottles, coolers and other dairy equipment. In the farmhouse oil and gas are used in the kitchen and for lighting, heating and refrigeration.

"In the poultry industry incubators and brooders are largely heated by gas burners and most of the cowsheds are still heated and lighted by gas. Liquefied petroleum gases have many uses on the farm in supplying motive power, in smoking meat and ripening vegetables, in heating incubators and stock tanks and in pasteurizing and sterilizing."

Dr. Egloff pointed out that from ethane, a constituent of natural gas, a fumigant is made with which to combat insect pests which attack stored grain, flour and cereals. This fumigant also has a deadly effect against insects that attack stored tobacco, and furs.

Oklahoma Natural Outlines Underground Storage Plan

DURING a recent hearing before the Oklahoma Corporation Commission to determine the demand for natural gas from the major gas fields of Oklahoma during June and July, it developed that the Oklahoma Natural Gas Co. is concentrating this summer on gathering "distress" gas in oil fields and running into underground storage all gas in excess of current demands on its lines.

The company announced through Carl Cloud, its general superintendent, that during the summer months—the period of low demand—it will discontinue purchase of gas from the Chickasha field and draw its gas from the Crescent-Lovell, Coon Creek, and South Moore oil fields, and from fields in the greater Seminole area, and run it into storage. Cloud told the commission his company feels that by following out this policy during low demand months it is practicing real conservation.

The company has two underground storage projects, the Osage storage and the Haskell storage. The Osage storage, northwest of Tulsa, holds approximately 1.5 billion cu. ft. of gas when the reservior pressure is 330 psi. At this pressure the storage can deliver about 50 MMcf per day into the Tulsa distribution system, a little more than half its peak load on winter's coldest days. The Osage storage has five injection wells.

The Haskell storage, near Haskell, Okla., has nine injection wells, and a capacity of about 7.5 million cu.ft. It is located so that it will deliver gas through two main lines leading to Tulsa and through other lines to Muskogee and Okmulgee.

In the winter when loads frequently tend to exceed pipe line capacity, the stored gas can be withdrawn to relieve the main lines as well as the production system. The two storage reservoirs also serve as a standby source of supply during such emergencies as pipe line breaks or other serious service interruptions.

Edmonton Asks Rate Slash

Edmonton, Alberta, Can., may soon have one of the lowest gas rates of any city in North America, if a new scale is approved by the city council. The proposed rates, affecting customers using up to 30 Mcf per month, would be 20 cents per Mcf after the first four. Present rate is 25 cents after the first four, which are obtained for a flat $2.

Edmonton's gas comes direct from the Viking-Kinsella field, which gives a saving now to be passed along to the consumer. It can be produced at a cost of about three cents per Mcf.

THE GORDON *Spreader-Flame* IS ENGINEERED TO SOLVE THE PROBLEMS NO OTHER BURNER HAS EVER COMPLETELY LICKED . . .

ROBERTS-GORDON conversion gas burners utilize the unique patented SPREADER FLAME principle. A properly proportioned mixture of gas and primary air is led through a single burner port, mixed with a converging stream of secondary air, deflected outwardly by special plates and thus scrubs upward over the entire sidewalls of the furnace or boiler. All of which means . . .

√ All three methods of transmitting heat—radiation, convection and conduction—are used and are instantaneously effective.

√ The burner is adaptable to *all* types of gas, manufactured, mixed or natural, with no change of parts.

√ *One* size burner serves *all* furnaces with input requirements of 50,000 to 210,000 BTU's—*reducing your inventory needs by 80%.*

√ The Gordon TELESCOPING MIXER limits the protrusion of the air duct more than 10 inches outside *any* furnace, making *any* customer your *immediate* customer.

Roberts-Gordon, the pioneers of the gas conversion industry and originator of the spreader-flame principle, builds more units than any other company and makes also the famous "400" gun-type burner.

GAS

ROBERTS-GORDON APPLIANCE CORP., 137 ARTHUR ST., BUFFALO 7, N. Y.

Represented by: *Look in the list for the representative nearest to you.*

Alabama, Birmingham 3
S. C. Bratton
Martin Bldg.

Illinois, Chicago 5
Ruud Humphrey Co.
1223 So. Wabash Ave.

Indiana, Indianapolis 4
Brooks Morris
5047 N. Capitol St.

Massachusetts, Boston 16
Herbert H. Skinner
250 Stuart St.

Michigan, Detroit 21
E. C. Lamlein
12768 Grand River Ave.
Phone Hogarth 0154

Missouri, St. Louis 8
Roberts Gas
Appliances, Inc.
9 S. Vandeventer St.

Nebraska, Omaha 11
J. G. Cameron
579 Insurance Bldg.

New York, Metropolitan
John C. Fullerton
2 Winthrop Ave.
Tuckahoe

New York, Buffalo 13
W. A. Hammond
261 Highland Ave.

New York, Rochester 7
Wm. J. Gillette
196 Chestnut St.

Ohio, Cincinnati 2
F. J. Scull
626 Broadway

Ohio, Westlake
R. E. Landers
3606 Dover Center Rd.

Pennsylvania,
Philadelphia 22
Porter Hurd
1500 N. 8th St.

Pennsylvania, Pittsburgh 19
Ridge Appliance Co.
1505 Berger Bldg.

Texas, Dallas 5
E. H. Durning Company
3220 Stanford Street

Utah, Salt Lake City
W. L. Peterson
733 East 3450 South St.

Wisconsin, Milwaukee 3
J. H. Fagan
161 W. Wisconsin St.

Gas Solves Drying Problem

For Chicago Pottery Manufacturer

By WILLIAM HELME

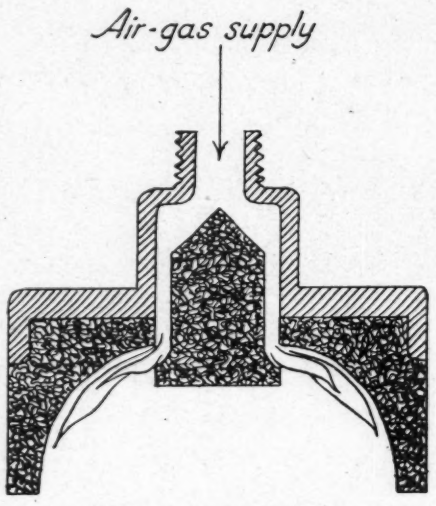
Industrial Sales
The Peoples Gas, Light and Coke Company
Chicago, Illinois

THANKS to American ingenuity and workmanship, it is not necessary to look abroad for dinnerware needs. On Chicago's South Side, the Stetson China Co. is turning out each week over 250,000 pieces of attractive dinnerware priced within easy budget range of the average wage earner.

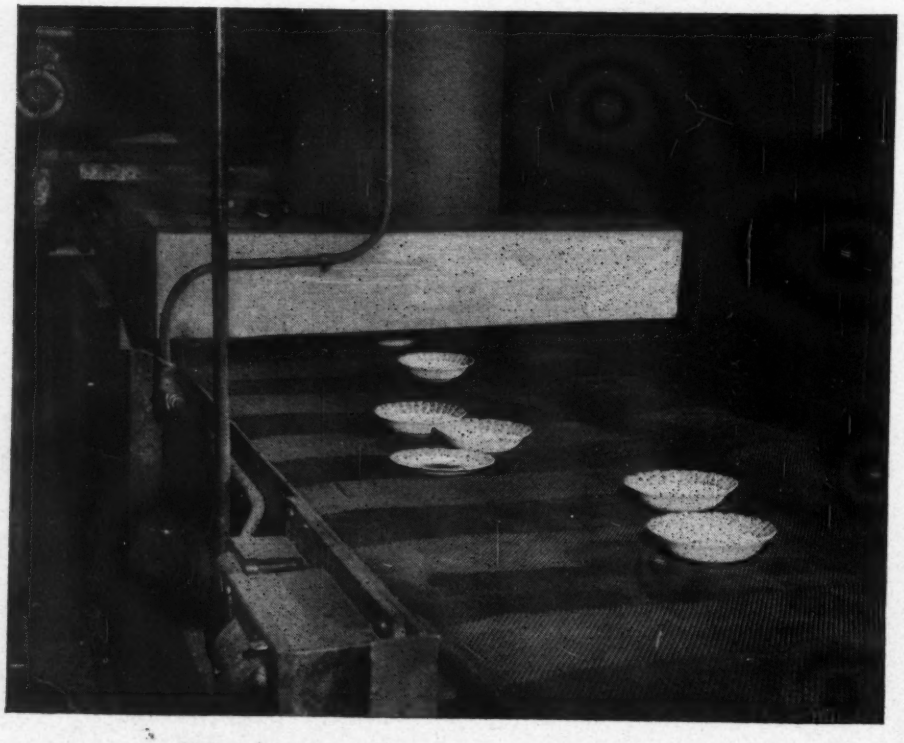
But Stetson had a problem—a drying problem. Ninety per cent of the pieces being processed are decorated with fancy floral designs or patterns. This is done by use of a decalcomania which transfers the designs from paper to the porcelain dish. A sizing, or coating of paste, is then applied to the decalcomania so that it will adhere to the dish before going into the firing kiln. As the various plates and saucers come off the conveyor belt with the floral design still moist, it is necessary to stilt them. This consists of placing three or four ceramic tripods between each stacked dish to separate it from the others and not scuff the pattern.

Stetson desired to eliminate this stilting process if possible, so engineers from the industrial sales department of Peoples Gas Light and Coke Co. were called into consultation at the plant, to determine ways and means of applying sufficient heat to the moist dishes moving along the conveyor belt so that they would be thoroughly dried and ready to be stacked when they reached the operator at the end of the belt.

Careful consideration was given to the problem and it was decided to install a series of gas-fired radiant cup burners over the moving belt. As the dishes still moist from the sizing passed through on the conveyor, they were exposed to radiant gas heat which quickly dried and prevented scuffing of the floral design on the dishes when stacked.



Cross-section of radiant cup burner used on installation at Stetson China Co.



Dishes leaving gas dryer on way to stacking table.

As a result of the successful operation of this gas-fired equipment, the operator can now easily stack without stilting, all the dishes as fast as they come off the conveyor belt. The operation has been speeded up, spoilage of the product has been reduced, and the handling costs cut down. The customer, happy about the whole thing, is planning on installing additional gas-fired equipment in the near future.

Kansas City Companies To Acquire UGI Stock

B. C. Adams, president of the Kansas City Gas Co. and The Wyandotte County Gas Co., has announced that these companies have entered into a contract to acquire the preferred stock interest of the United Gas Improvement Co., Philadelphia, in the two Kansas City companies, at an outlay of $5,150,000. UGI operated the Kansas City and Wyandotte distribution companies prior to about 1919.

The Kansas City Gas Co., on approval of the Securities and Exchange Commission, will acquire 33,401.96 shares of its own 6% cumulative first preferred stock and 15,527.36 shares of its 6% noncumulative second preferred stock.

The Wyandotte County Gas Co. will acquire 1000 shares of its 6% cumulative first preferred stock and 4000 shares of its 6% noncumulative second preferred stock.

It was anticipated that, subject to SEC approval, delivery and payment would be made shortly after July 1. Adams believes the move will "materially improve the capital structure of both acquiring companies."

Color Dynamics Used in St. Louis Firm's Offices

The lives of employees of the Union Electric Co. of Missouri and its subsidiary, the St. Louis Gas Co., are more colorful these days—literally.

Union is redecorating its offices, replacing the buff paint on the walls with seafoam green, suntone, rose tan, and stratosphere gray, in an effort to improve working conditions. The science of color dynamics is being employed in an effort to achieve the purpose.

The color combinations being utilized by the company help to create the proper mood among employees and customers, and relieve eyestrain, reduce fatigue, and relieve monotony, thus stepping up efficiency.

The scientifice use of color in industry was given impetus during the war, when applications of it proved that production could be materially increased.

Union Electric plans to repaint all walls every five years. The work is done at night and does not interfere with office routine.

TECHNICAL TRENDS

By GUY CORFIELD, Technical Editor

Technology May Close the Gap

It is probably the general thought or expression that there are and always will be basic if not inherent differences between natural and manufactured gas as regards composition, availability and price. Technically, at least, this had never seemed axiomatic as the two gases are essentially of carbohydrate or hydrocarbon origin and both contain carbon and hydrogen as their effective ingredients. A new usage or modification of natural gas through chemical processes, and a new and cheaper way of making manufactured gas, could close the gap between the two and might even bring nearer to fulfillment the dreams of many for uniformity of gas composition.

Two possibly very significant trends in this direction have been announced in the paper entitled "Gasoline from Natural Gas" by P. C. Keith, in the June issue of this magazine.

Mr. Keith first describes the Hydrocol process whereby natural gas is converted into gasoline, diesel oil and crude alcohols at overall costs competitive with today's prices for these commodities. He reasons that this process, whereby 8 Mcf of natural gas will produce a barrel of oil, will raise the value of natural gas, bringing equality of gas at 17 cents per thousand and oil at $1.35 per barrel, delivered to the refinery.

The second trend involves the separation of "cheap oxygen" from air, by liquefaction and fractionation, at an estimated cost of less than 5 cents per Mcf of oxygen; and the gasification of coal with this oxygen to produce an approximately 1000 Btu gas which could be made or delivered on the East Coast at prices at least competitive with natural gas transported in pipe line from Texas.

Technical College Degrees by Mail

On the premise that the gas industry will progress technically as it is able to employ and develop technically trained personnel, and that the college graduate level is an acknowledged and readily accepted standard of technical education (with considerable benefit accruing from actual possession of a "sheepskin"), and that a combination of industrial practice and academic learning produces the most efficient technologist, it is perhaps not too radical to suggest the desirability of correspondence courses giving credits and enabling the completion of a college degree in fuel gas engineering or technology.

Many gas industry employees have found it necessary, for a variety of reasons, to terminate their higher technical education short of a degree. Those working within attendance distance of colleges cannot always arrange to work nights so as to take daytime lectures, or even to attend the evening classes offered by some institutions; and many are employed at locations remote from such facilities.

The recently publicized Home Study Course in Natural Gas offered by the University of Kansas does not give any credit toward a university degree even though it requires work equivalent to that of a course in engineering giving credit to five or six hours. As far as we know, other institutions providing technical correspondence courses also refrain from granting degree credits for such courses.

The nearest approach to off-campus education giving degree credits that has come to our attention is the "training within industry" activities of the Illinois Institute of Technology, of Chicago, which has been conducting courses throughout the general Chicago area. Examples are a large graduate program with the Allis-Chalmers Company in Milwaukee, which has registered more than 100 students for studies toward the masters degree; and the sending of one instructor to Peoria, Illinois, for a special graduate course given in the plant of the Caterpillar Tractor Co.

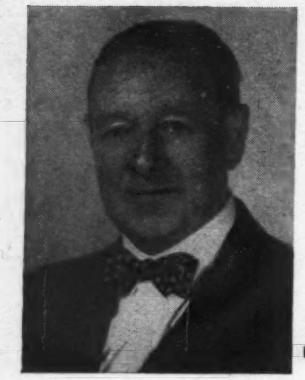
While such facilities are invaluable to those able to use them they are, of course, of no help to the undergraduate working in an oil field or compressor station or other isolated or rural location.

It is recognized that higher education and degree conferring must be maintained at their present high and carefully regulated and administered level, but there is perhaps some way to maintain this level and still give the benefits of correspondence courses to the near-graduates who are ambitious to complete their bachelor's degree or obtain a higher one.

Natural Gas Producers May Use Water Gas

It is an intriguing combination of the old and the new when modern natural gas producers consider the usage of water gas as a production and cycling medium! Some detail of this potential development is given in the article by Frank H. Dotterweich and E. O. Bennett entitled "Trends in Processing Gas Condensate Reservoirs" appearing elsewhere in this issue.

It is brought out that retrograde condensate reservoirs can possibly be repressured and cycled with more overall efficiency by use of water gas made from natural gas and "cheap oxygen" than by the natural gas itself. A given volume of natural gas will produce about three volumes of water gas or, expressed in another way, if a given volume of natural gas is originally produced, only about one-third need be injected (as water gas) to restore the pressure, the remaining two-thirds being available for sale; and, for re-cycling, the water gas is actually a more efficient medium because it exerts a greater stripping effect on the reservoir.



PROMOTIONAL NOTES and NOTIONS

By STANLEY JENKS

This "Pent-up" Demand

The truth about this "pent-up" demand, so glibly mouthed by the New Dealers and their tame economists, is now beginning to appear. Much of it is fictitious. Without a doubt, Mr. and Mrs. John Q. Public meant what they said when they told one of these survey fellows that they planned to buy a refrigerator as soon as refrigerators were available. The truth is, they were so anxious to get a refrigerator that they listed themselves as would-be purchasers with every dealer in town. In other works, they alone—and there are thousands and thousands of them—created a backlog for 12 refrigerators. When they take the first one made available to them, the "pent-up" demand for 11 refrigerators disappears. This is no exceptional case. Automobile dealers and laundry appliances dealers especially are already seeing their postwar dreams dissolving into nightmarish realities.

Manufacturers I know, with production backlogs bigger than all-get-out, are beginning to appreciate the duplications.

I know a building supply jobber who has identical orders placed with six manufacturers. Only one of them will get the business. The other five will get cancellations.

The New Deal economists probably are recognizing these distasteful truths when they say, as they are doing, that we are over the inflationary hump. They know that the supply, despite strikes and official bungling, is closer to meeting the real demand, now that it is being deflated to its proper size.

Public Taste

In those bad old days, when utilities merchandized just for the hell of it, a harassed sales manager of a large combination company sent his bright young assistant to the big city to buy several hundred electric floor and bridge lamps.

The purchases arrived—and what a conglomeration of eyesores they looked to the aforesaid h.s.m. Sultry purples, sickly greens, vivid reds reproduced in crude beaded shades and designs of frantic jungle parrots and suchlike. Compared with the subdued, genteel jobs that graced the company's main display floor, and which incidentally sold most casually, these purchases were esthetically impossible.

But the bright young assistant knew his stuff. The eyesores were displayed *en masse* in an office in the heart of an industrial district, where Negroes, Mexicans, and first generation southern European steel workers lived. These lamps sold like the proverbial hot cakes, and at a handsome profit too.

The moral is obvious. Successful merchandising is selling the public what it wants. Appliance promotional effort, such as we know it in the gas utility industry, is persuading the public to buy what we think it needs. There is an important difference.

The job of the utility appliance promoter under our modern methods of load-building is to strive continually for the happy medium which produces merchandising profits for the dealers and manufacturers, and connects an increased net load to the utility's service system.

Beating Inferior Competition

Talking about creating a public need for our services, which of course has to be done through the greater use of gas burning appliances, the importance of skillful display and demonstration cannot be overlooked.

It is an anamolous situation, but few appliances are sold solely on their built-in merit alone. Every salesman in his time has had the heartbreaking experience of seeing the business to go to an inferior product because the competitor had more skillfully displayed or demonstrated his appliance. The proof of this is right under our noses in the number of inferior electric ranges where gas service is available.

Today, while gas appliances are in short supply, we are likely to overlook the finer point sof sales promotion. But, good salesmanship—the type we are going to need sooner than most of us expect—is not acquired overnight. Now—Yes, now!—is the time to be building our sales fences, the stakes of which are representatives intelligently trained in the merits of modern gas service.

Fishy

May I add my very personal endorsement of the recent "New Freedom Gas Kitchen" advertisement headline. You remember, it read: "Where food is finest, it is cooked with gas."

Like all good things in life, you don't appreciate them fully until you have to do without them. I found this true of gas service recently in San Jose, Costa Rica, a splendid little country in Central America, but entirely devoid of either manufactured, natural, or BP gas service.

Along with my two colleagues, I was smitten with "enfermedad de turista" (tourists' sickness). Talking things over, we decided to blame a chunk of under-cooked tropical fish we ate one night in one of San Jose's best restaurants. I remember commenting to the waiter that the fish was not so well cooked as it might have been. He profusely expressed his deepest regrets, and explained that because the voltage was so low—hydro-electric source in the height of the dry season—it was simply impossible for the chef to get more heat.

Being accommodating fellows and desperately hungry, we took the chance, and paid the price.

It would never have happened though if that handicapped chef had been cooking with gas.

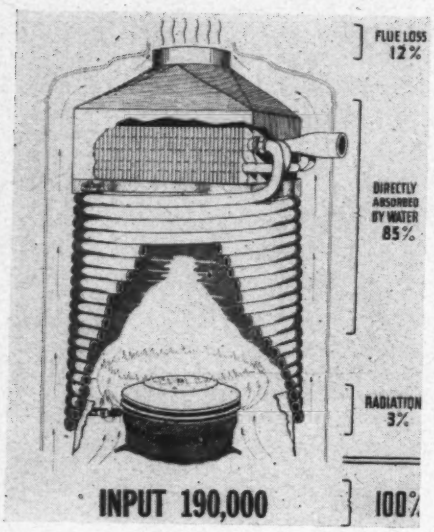
Hardwick's testing and developmental laboratories are among the largest and most complete in the industry. Since Hardwick makes its gas ranges complete, including manufacture of its own patterns, dies and jigs, desirable changes in production can be made swiftly.

Through strict laboratory and scientific controls, guesswork is eliminated at every step of design and production. No Hardwick gas range is put into production until exhaustive laboratory tests have proven conclusively that it is tops in cooking performance. Since 1879 Hardwick has built good stoves. Hundreds of thousands of Hardwick customers agree that Hardwick makes the best gas range in the moderate price range. When you feature the Hardwick line you can be sure you're right—and go ahead.

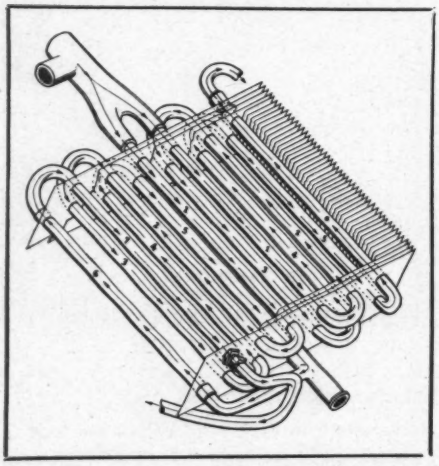
HARDWICK
Gas
RANGES

HARDWICK STOVE COMPANY
CLEVELAND, TENNESSEE
The Quality Line Since 79

Sales Pointers . . . on New GAS Appliances



Cutaway shows distribution of heat input, resulting in 85% efficiency. The burner operates at varying rates of gas input with equal thermal efficiency.



Shown above is the heat exchanger, mounted in the top of the heater, which promotes rapid transfer and high absorption of heat.

Two-Temperature Water Heater

Manufacturer: A. O. Smith Corp., Milwaukee, Wis.

A water heater that will provide simultaneously water of two different temperatures—140°, the normal hot water temperature, and 180°, for sterilization purposes—is the new SMITHway-Burkay instantaneous gas water heater. It's potential markets, therefore, are restaurants, taverns, hotels, apartment houses, beauty shops, barber shops, dentists' and doctors' offices—in short, any establishments where requirements are complicated by the need for large quantities, intermittent peak loads, and sterilizing heat.

Examples of the types of markets being tapped by SMITHway-Burkay dealers include the Oakmont Country Club, Los Angeles, where a battery of seven heaters maintains correct temperatures in a swimming pool; Isbell's restaurant, Martini's, and some of the Thomson chain in Chicago; Caruso's restaurant in New York, where two heaters are furnishing two-temperature water at a million gallons a year.

The manufacturer has selected the following selling points as the most salient:

1. *Two Temperatures Simultaneously.* The heater maintains 140° temperature in a tank, from which the water can be drawn as desired, but when superheated water is wanted the heater also draws from the tank, boosting the temperature to 180°.

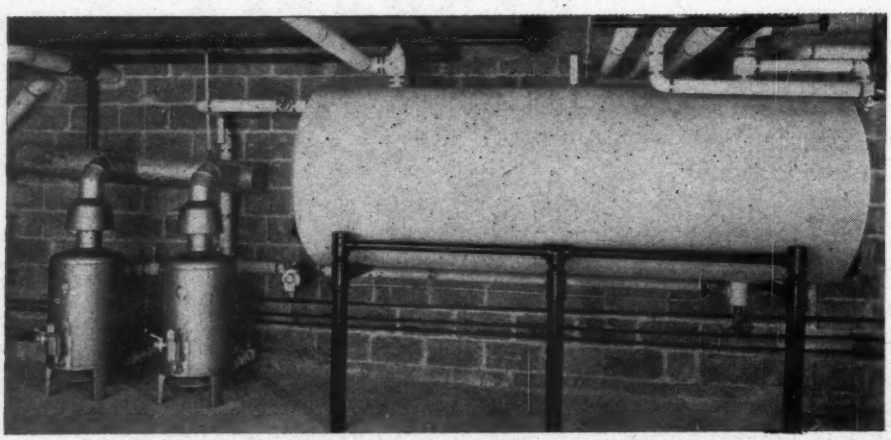
2. *Capacity.* Per hour Btu output ranges from 190,000 to 195,000, resulting in the heating of 125 gals. of water from 50° to 180° in an hour, or 3000 gals. per day.

3. *Efficiency.* The SMITH-way-Burkay has a thermal efficiency within 4% of theoretical maximum, an 11% loss being essential for combustion. A flue loss of 12% coupled with a radiation loss of 3% gives a total loss of 15%. Radiation loss is materially reduced by the type of construction: the tubing through which the water flows after entering the unit at the top is coiled in such a fashion that it forms the wall of the combustion chamber.

4. *Adaptability.* As an instantaneous heater it furnishes hot water at the turn of a tap; as a recovery system it stores hot water in a tank and recovers the heat loss when water is drawn from it; as a booster, it takes water already heated by a furnace or other means and boosts it to superheat; as a booster-recovery system it provides two-temperature water. Several units can be connected in batteries, giving a wide range of capacity.

5. *Constant Temperatures.* Water outlet temperatures within two degrees of the thermostat setting are maintained through a patented thermostatic control which varies the gas supply directly as the water flow varies. The burner's two stages of primary air and auxiliary supply of secondary air insure more complete combustion, selecting the correct proportion of gas and air.

6. *Heat Exhanger.* Thirty square feet of heat transfer area is exposed to a total water content of only four pints. Heat absorption approaches theoretical maximum, heat transfer is very rapid, and resulting low stack temperatures cut heat loss.

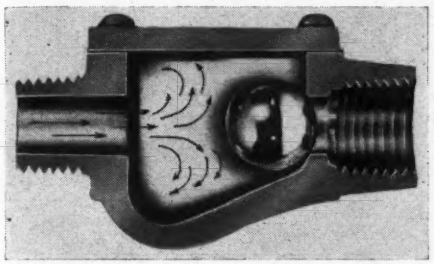


A typical installation, showing two heaters working as a battery, functioning as 1) instantaneous heaters, and 2) a recovery system, storing hot water in the tank and recovering heat loss as water is drawn off.

NEW PRODUCTS

Safety Check Valve

Hackett Manufacturing Co., Oakland, Calif.
Model: Numatic Safety Check.
Application: Eliminates the danger of wildly whipping compressed air hoses by shutting off air immediately in the event of excessive flow. Possibility of damage to compressors or manifolds through travel-back of whipping action in hoses is removed. Bad leaks in lines are revealed before they can cause damage, and inefficient tools which waste air will not operate if the safety check is used. Because loss of air is



minimized, wear on compressors is cut down considerably.
Description: There are two main parts in the Numatic safety check — the housing and a steel ball. The ball rests between the hexagonal ends in a sump at the compressor end of the valve. This sump slopes upward toward the discharge end, where there is a machine port smaller than the ball. Excessive flow of air causes the ball to roll up the slope, sealing off the port and shutting off air to the line. A bleed hole allows the escape of a small amount of air, which equalizes the pressure between the air line and pressure tank when the line is made air-tight. When the pressure is nearly equal, the ball drops away from the port and rolls back down into the sump.

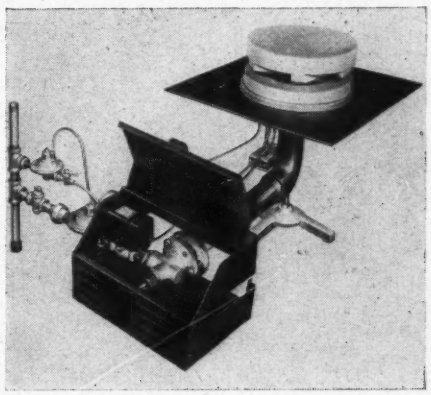
The Numatic safety check is designed for working pressures up to 250 lb. and comes in standard ½-in. and ¾-in. sizes. It is distributed through E. D. Bullard Co., 275 Eighth St., San Francisco, Calif.

Gas Alarm System

Davis Emergency Equipment Co., Inc., 45 Halleck St., Newark 4, N. J.
Model: Combustible Gas Alarm System —Remote Head Type.
Application: To detect the presence of combustible vapor and/or gas, give an audible signal before mixture with air becomes dangerous, and control appliances such as shutting down machines or starting ventilating.
Description: The analyzer head is housed in an explosion-proof conduit in the area being sampled, and the analysis is made under the actual temperature conditions at the point where the gas or vapor-air mixtures exist. The control cabinet may be located at any distance in a gas-free area. The signal of any change in the gas or vapor concentration reaches the control cabinet through an electric cable and therefore the response is instantaneous. A filament flow-out signal gives operator a visual indication if any analyzer head is temporarily inoperative. Simple filament replacement is possible.

Conversion Burner

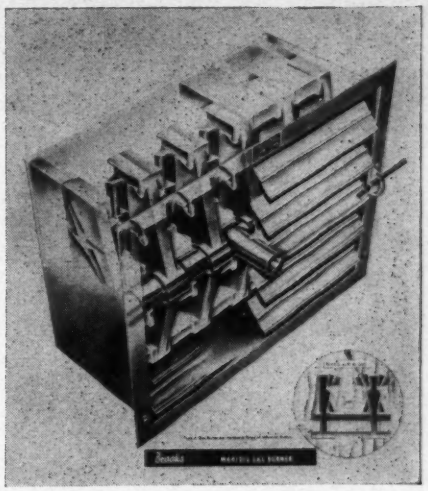
El Van Eyre Corp., Williamson Bldg., Cleveland 14, Ohio.
Model: El Van Eyre Conversion Burner.
Application: Designed as a conversion unit for coal burning furnaces, but also useful as factory installed equipment in factory and steam boilers.
Description: The standard package consists of a burner, automatic pilot, Detroit Lubricator gas valve and Detroit pressure regulator. Three-quarter-in. controls are included, although 1-in.



and 1¼-in. controls are available by special order. Three sizes of installations are thus afforded. The control valve is adjustable for setting the proper input at the time it is installed in the furnace. A square baffle seals off the fire box and directs all auxiliary air through the combustion chamber of the burner, creating a cyclonic action directed by the veins of the upper refractory. This A.G.A.-approved burner will not pop back, and may be used with manufactured, mixed, and natural gas. Input rating varies from 85,000 to 270,000 Btu. Combustion efficiency varies from 78% to 84%, depending upon the installation.

Gas Burner

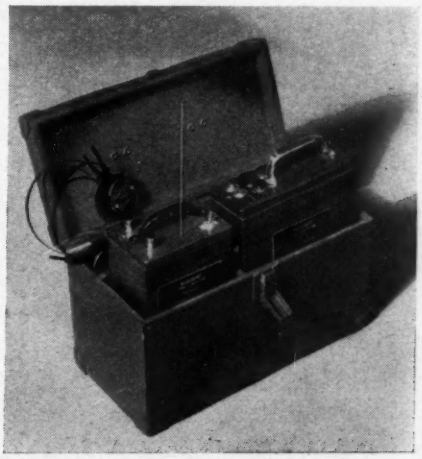
Brooks Equipment Co., 636 Potrero Ave., San Francisco 10.
Model: Martois Gas Burner.
Application: Adaptable for all industrial uses.
Description: Designed so that a large number of gas orifices is used even where boiler front space is limited, the resulting extremely low pressure firing added to complete combustion of the fuel means substantial gas savings in boiler and furnace maintenance.



Burner is furnished complete with connecting nipples and firebrick splits, inclosed in steel box with louvre-type air control for installation in ashpit doors, boiler front or furnace wall. Size of assembly is determined by boiler rated horsepower, gas pressure available and operating conditions.

Pipe Locator

Nilsson Electrical Laboratory, Inc., 103 Lafayette St., New York 13, N.Y.
Model: Wahlquist Pipe Locator Model 112.
Application: For determining location and depth of pipe lines.
Description: Transmitter and receiver are contained in separate walnut cabinets with carrying handles attached. A carrying case is also furnished for transporting the two cabinets and a set of headphones as a single unit. The cabinets each weigh four lb. In operation, the transmitter sends a test signal to the pipe or conduit, and remains stationary. The receiver unit, consisting of internal pick-up coil and battery-operated three stage amplifier, is carried vertically over the area containing the pipe. The signal is controlled by a push button located on the receiver; maximum signal strength will



be reached when the instrument is directly over and parallel with the pipe. By various methods, any point in a pipe line may be located whether any location point on the pipe is known or not, and whether the pipe is bare, poorly coated, or well coated.

The First was a Smash Success

NOW...another record-breaking

Serwel, Inc.

EVANSVILLE 20, INDIANA

Indiana Commission Favors Minimum of Regulations

THE day of long, tiresome and expensive hearings in utility regulation — particularly as concerns rate matters — is past, Leroy E. Yoder, chairman of the Public Service Commission of Indiana, told members of the Indiana Gas Association at their recent meeting.

The philosophy of the commission, Yoder said, is toward a minimum of regulatory laws, and toward voluntary negotations between utilities and the commission, obviating the necessity of tedious hearings. He characterized the latter as a "healthy trend in the right direction."

Assumption and theories must go out the window, he declared, in favor of a scrutiny of past and present facts. A study of court decisions in rate cases has shown that no simple formula can be devolved. Continued analysis of the rate-determining elements—capital, operating costs, depreciations, revenues, profits—must replace court hearings.

"We of the Indiana commission believe that regulation which regulates least is the best. We believe further that it is our sworn duty to regulate for, as well as against, utilities."

The ten-point creed of the Public Service Commission of Indiana in regulating utilities was presented by Yoder, as follows:

1. We believe a minimum of laws and regulatory measures is desirable.
2. We believe laws and regulatory measures should be adopted ONLY when there is a reasonable probability that the public will benefit.
3. We believe, as a rule, regulations should be predicated upon complaints of utilities or the public.
4. We believe laws and regulations should be restraints and when they pass beyond this boundary they destroy executive ability.
5. We believe regulation which stifles initiative in furnishing a new and better or cheaper service is objectionable.
6. We believe laws and regulatory measures should at no time invade the province of management.
7. We believe rates at no time should permitted to be less than something more than the "out-of-pocket" cost and at no time more than the full cost, which includes a reasonable return upon the investment.
8. We believe the public should be willing to pay the full cost of service.
9. We believe that the theory that government officials are more competent to pass upon policy and administrative details in connection with managerial affairs is not sound.
10. We believe that utilities should be regulated to the fullest extent required by the public interest and no more—in which case there can be no complaint that the same is not "fair and impartial" and that there has been an inequality of treatment.

Houston Natural Sponsors "Classroom of the Air"

"Classroom of the Air," a radio broadcast emanating from the laboratory of the home economics class at Texas College of Arts and Industries, Kingsville, Texas, has begun under the sponsorship of the Houston Natural Gas Corp.

The program is heard over Station KWBU, Corpus Christi, at 10:15 a.m. each Monday, Wednesday, and Friday.

Buying and preparation of foods and the planning of meals are some of the subjects discussed by the students, led by Miss Aline McKenzie, director of home economics at the college. Each session is concluded with a recipe which has proved such a popular feature with listeners that a bulletin entitled "Radio Recipes of the Month" has been printed and is distributed through Houston Natural's offices.

Master Plumbers Accept PCGA Heater Sizing Program

The California State Association of Master Plumbers, at its recent 45th anual convention in Los Angeles, endorsed the water heater sizing program of the Pacific Coast Gas Association (previewed in GAS, Nov. 1945, p. 26-29.) as a result of a presentation made by Clyde H. Potter, manager of appliance sales, Southern Counties Gas Co.

Potter, as chairman of the PCGA Water Heating Council, has been active in promoting the program on the West Coast. The council produced a sizing chart (see GAS, Nov. 1945, p. 27) and a booklet, "Gas Water Heater Sizing Location and Installation," which have been ordered by practically all companies in the association. Reports from West Coast cities indicate that stress is being placed on the sale of larger capacity heaters to meet postwar demands.

Industrial Relations Topic Of A.G.A. Personnel Meet

Industrial relations developments held the spotlight at the A.G.A. Midwest Personnel Conference, held in Kansas City, Mo., June 6. F. R. Rauch, president of the association's personnel committee, and vice president of the Cincinnati Gas & Electric Co., outlined the association's plans for the general sessions on industrial relations to be held at the convention in Atlantic City the week of Oct. 7, while Kurwin Boyes, secretary of the A.G.A., and one of the principal speakers, told the members of current developments in this same field.

The practical selection and placement of employees was discussed by M. B. Mathis of the St. Louis County Gas Co. Supervisory training and aptitude tests were also treated in various talks.

Caloric Gas Stove Expands

Caloric Gas Stove Works has announced an expansion program which includes a 90,000 sq. ft. addition to manufacturing plant facilities at Topton, Pa. The company predicts that the added facilities will increase production in 1947 by 200%.

In anticipation of this increase, Caloric is promoting an intensive local and national advertising campaign and has prepared a sales manual and a sales training program to assist retailers.

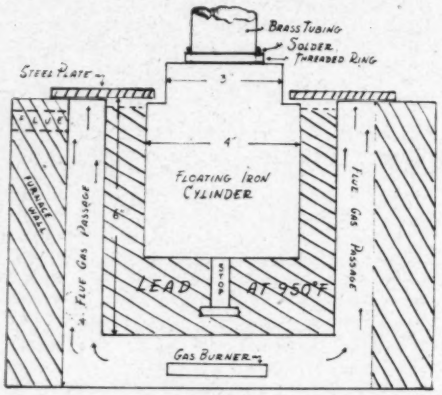
Luck came twofold to Stewart M. Herman of Seattle, recently, when he won two $500 prizes for designs he had entered in the national $18,000 Magic Chef "Gas Range of Tomorrow" contest. Ray W. Campbell (right), Pacific sales division manager of American Stove Co., which sponsored the contest, is shown presenting the two checks to Herman. N. Henry Gellert (center), president, Seattle Gas Co., offers congratulations. The more than 500 entries received from all over the United States represented the greatest collection of practical kitchen ranges ever assembled.

OPERATING IDEAS

Localized Heating Method for Soldering Jobs

ROYAL E. HUNT, industrial sales engineer, Brooklyn Union Gas Co., Brooklyn, N.Y.

Localized heat for soldering operations is provided by floating a cast iron cylinder in molten lead and then bringing the work to be soldered in



contact with the hot cylinder, a method devised in response to a request by one of the company's customers, who wanted a practical means of soldering threaded rings onto the end of a brass tubing without having to heat the tube enough to cause discoloration.

Although conduction heating is the principle involved, the method is said to have the advantages of induction heating at a fraction of the cost.

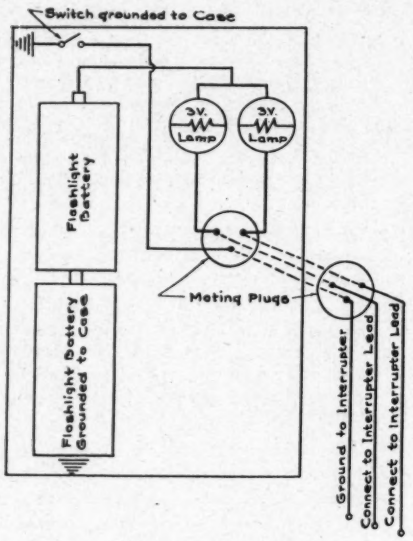
Solder is first placed in position and the ring is placed on the end of the tubing. The tubing is then set on the floating iron cylinder. Within 30 seconds enough heat has passed into the tubing to effect a permanent seal.

Synchronizer for Interrupter Points

FRANCIS J. THIELEN, engineer, Panhandle Eastern Pipe Line Co., Kansas City, Mo.

This instrument takes the guesswork out of repairing interrupters, indicating by lights when points are synchronized. To operate it, the points are set by a feeler gauge; then the synchronizer is connected, and adjustments are made until the two lights come on simultaneously. When the lights are timed properly, the point adjusting screws are locked.

If the interrupter is shorted, the fact will be shown by one of the lights becoming illuminated. It is claimed that the device will increase the efficiency of horizontal engines with twin ignitions, and will reduce excessive heating of cylinders and piston rods. In a test it was shown that five rpm's were gained by having the points timed properly.

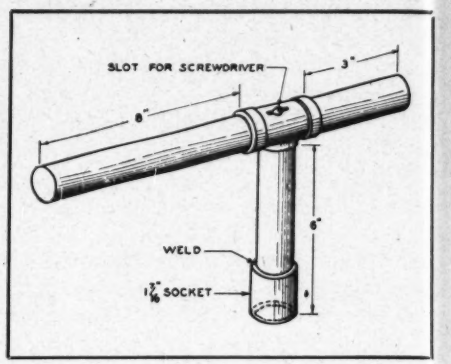


To construct the synchronizer, a metal box measuring 5½x3x11 in., two flashlight batteries, two bulbs, a single pole, a throw switch and wire were used.

Valve Tappet Adjuster

HAROLD H. ENDLY, oiler for Panhandle Eastern Pipe Line Co. at Olpe, Kan.

With this valve tappet adjusting tool for KVG Ingersoll-Rand engines, less than one-half the time formerly required for the job is needed. The tool is made with a ¾-in. pipe, a ¾-in. pipe

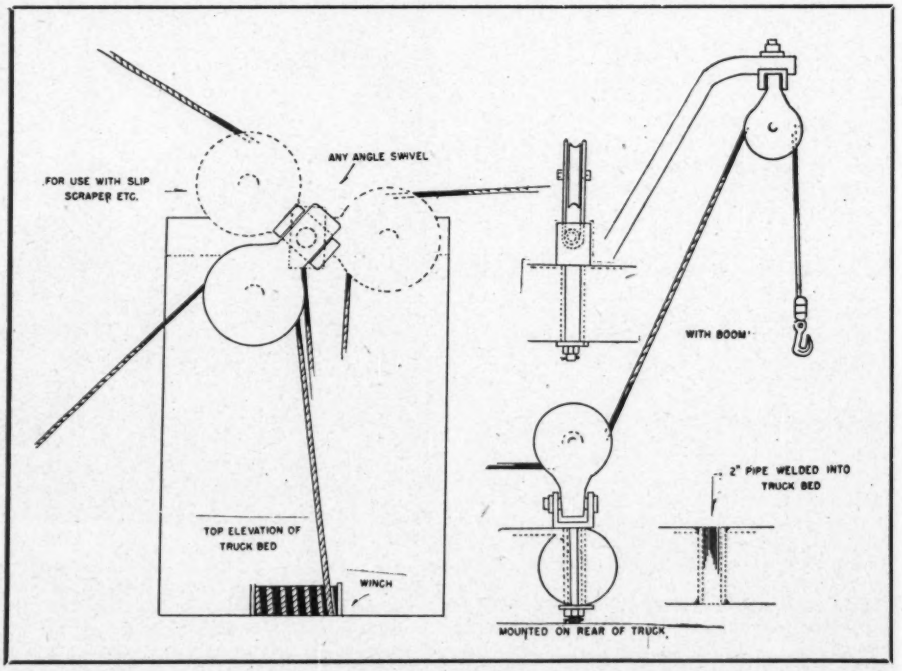


tee, and a 1-7/16-in. socket. It allows the adjusting screw to be held with a screwdriver while the locknut is being tightened, and it is easien to hold on the moving nut than is an ordinary wrench.

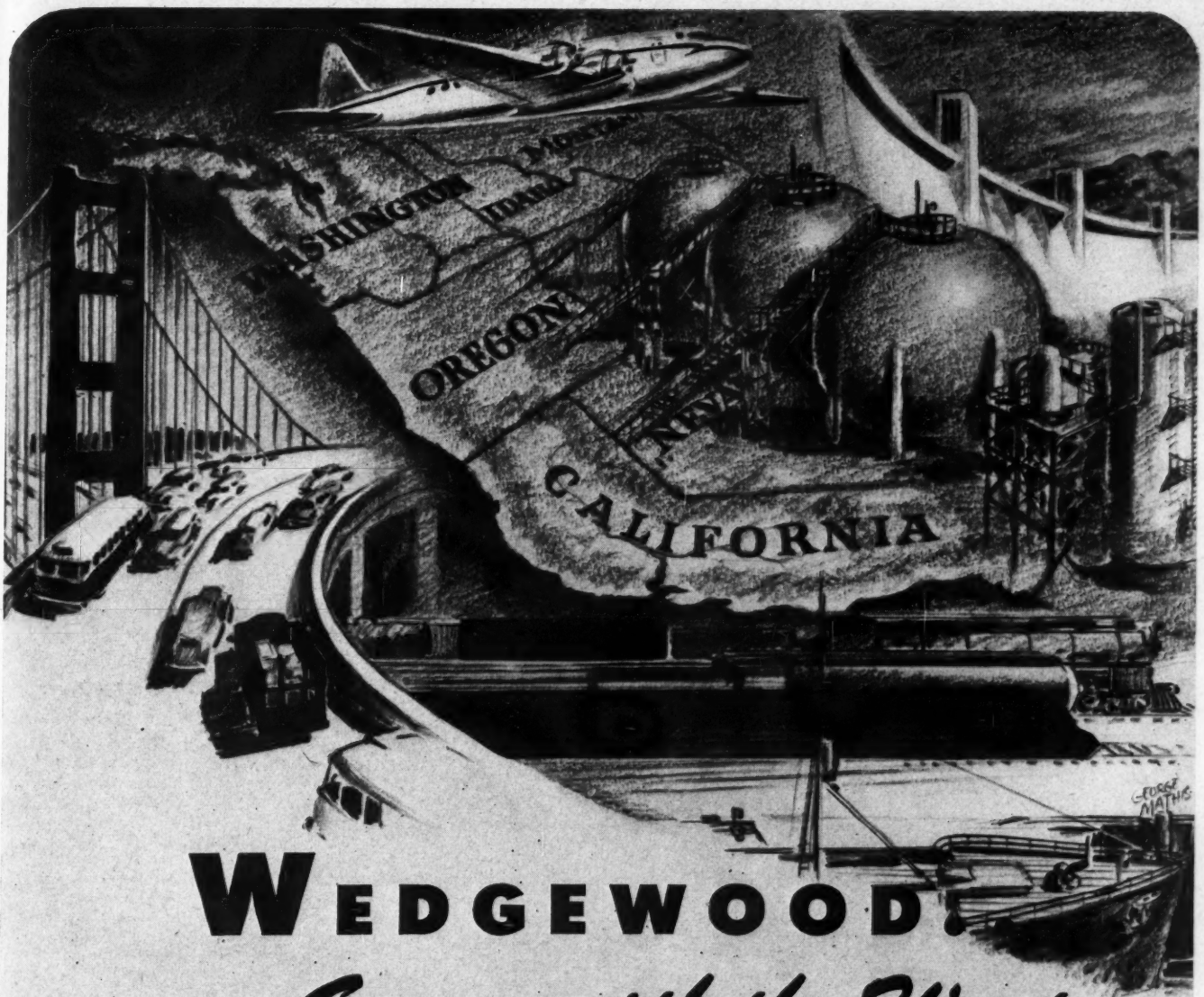
Three-Way Block

H. R. Graves, driver foreman, Zionsville, Ind., Panhandle Eastern Pipe Line Co.

This three-way block for truck beds is in use by Panhandle Eastern Pipe Line Co. and has proved a big time saver. It is safer than the old chain and snatch block method and lengthens the life of a winch line by keeping the line from wearing on the edge of the truck. All pulls are from the center line of the spool. The block works from either side of truck bed at any angle and is used for board or slip scraper work. It also serves as a tail block at the rear of the truck for A-frame work.


FOR USE WITH SLIP SCRAPER ETC.
ANY ANGLE SWIVEL
WITH BOOM
2" PIPE WELDED INTO TRUCK BED
TOP ELEVATION OF TRUCK BED
WINCH
MOUNTED ON REAR OF TRUCK

Three-way block for truck beds.



WEDGEWOOD

Grows with the West

● In step with the West's mighty march of progress . . . WEDGEWOOD moves forward by expanding manufacturing facilities, adding to plant and equipment, constructing new modern offices. In the bright new era to come, WEDGEWOOD will continue to serve the West with the same pioneering spirit that has marked the firm's growth since 1882.

MODERNS PREFER GAS

FOR ALL GASES, INCLUDING LP (LIQUEFIED PETROLEUM) GAS

A GI bride is interviewed in one of the school's radio broadcasts.

Portland Gas Company Instructs GI Brides From Overseas in American Cookery

THE Portland (Ore.) Gas & Coke Co. has its eye on a new market—GI brides from overseas.

Devised by the company as a "truly practical welcome," a school in American cookery was set up recently to introduce the overseas bride to American eating habits and cookery—and to the latest in American gas appliances and how to use them.

The classroom for the five classes was the completely modern all-gas kitchen in the company's "hospitality house."

Rita Calhoun demonstrates simmer burner.

The classes were devoted to the following subjects: 1) an introduction to American cookery, including lessons on wise shopping, kitchen terminology, and ingredient measuring; 2) breakfast menus, and how to prepare them; 3) luncheon menus, with particular emphasis upon salads of all varieties, and the proper selection of salad dressing; 4) dinner menus, which stressed the preparation of meats, pies and pastries, and 5) how to entertain, what to serve, and what to do when company "drops in" unexpectedly.

Each enrollee was given a pamphlet, "Bride's Guide to Good Cooking —Northwest Fashion," prepared by the home service department and featuring recipes for preparing delicacies of the Pacific Northwest.

During the second class a radio broadcast of ad lib interviews with the guests was transcribed by Station KEX. The recording was played back at the third session. A live broadcast was presented the fourth day.

The classes were conducted by Rita Calhoun, home service director, and were sponsored jointly with the Welcome Wagon Service Co., a nationwide organization devoted to welcoming newcomers to communities.

The school is believed by the company to be the first of its kind in the country. According to the company, it was well received by the "students" and received considerable favorable publicity in the Portland press.

Student Apprentice Plan Adopted by Gas Service

The employment of 12 to 15 student apprentices, to be chosen from enrollees in home economics courses in colleges in the vicinity, together with the addition of five regular employees, forms the core of an ambitious home service program expansion being undertaken this summer by the Gas Service Co., Kansas City, Mo.

The apprentices, all of whom have completed their junior year in college, are being employed during the summer months only, the company has announced. Purpose of the idea is to provide experience as well as the incentive to return to home service work upon completion of their college careers.

The company has also acquired the summer services of Elsie Lee Miller, an instructor in the department of home economics and nutrition at Kansas State College, Manhattan, who will organize the training program for both the apprentices and the new permanent employees.

Further plans for the amplified home service program include the scheduling of three meetings, in Kansas City, Wichita, Kans., and Joplin, Mo., at which leading home economists will speak.

Tappan Stove Co. Starts Sales Training Courses

A two-way program for training sales personnel has been inaugurated by the Tappan Stove Co., Mansfield, Ohio. "Training Retail Salesmen" and "Retraining Tappan Sales Representatives" are the two courses offered.

Aim of the courses is three-fold, according to Assistant Sales Manager D. S. Sharpe: (1) to teach new men the fundamentals of selling as they apply to Tappan ranges; (2) to serve as a refresher course for those who are returning to sales work, and (3) to teach why and how to sell Tappan features.

The retraining program consists of working on the assembly line, giving cooking demonstrations, and relearning the procedures of sales and advertising. At the end of the course, the representative is in a position to hold dealer meetings and to pass along the information.

The return of experienced salesmen and the influx of new salesmen now that production is in swing again make the program particularly timely, according to Sharp.

Two Range Makers Bought By Utility Appliance Corp.

Purchase of Gaffers & Sattler, Los Angeles range makers, and Occidental Stove Co., Irvington, Calif., has been announced by the Utility Appliance Corp. of Los Angeles. Present production and sales organizations will be retained in both companies, which will be operated as divisions of Utility Appliance.

Gaffers & Sattler, a 20-year-old firm, bought Occidental Stove Co. in 1938, and moved it from its San Francisco location to Irvington.

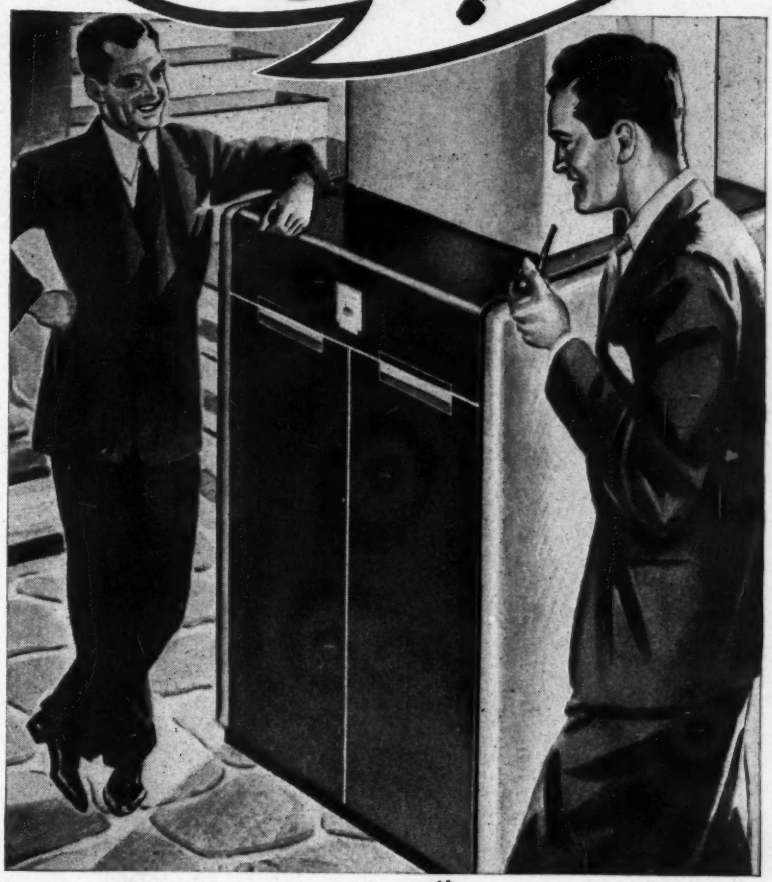
Under the terms of the purchase, George A. Sattler has joined the board of directors of Utility Appliance. The new owners are manufacturers of evaporators, air coolers, fans, blowers, and gas-fired heating equipment.

One reason people say, *We're sold on GAS!*

IT'S the reliable, year-after-year service provided by American-Standard Gas Fired Heating Equipment—service made possible by more than half a century of intensive research, manufacturing experience, and rigorous testing—that makes so many people say, "We're sold on gas!" In thousands of homes, people are passing on the good word to friends . . . telling them about the fine performance of their modern American-Standard installations.

Architects, too, recommend American-Standard Heating Equipment because of its proved dependability, smart appearance, and the completeness of the line.

You'll get more satisfied customers when you recommend American-Standard Gas Fired Heating Equipment. Each new installation in your area means another user who'll say, "I'm sold on gas." **American Radiator & Standard Sanitary Corporation,** P. O. Box 1226, Pittsburgh 30, Pa.



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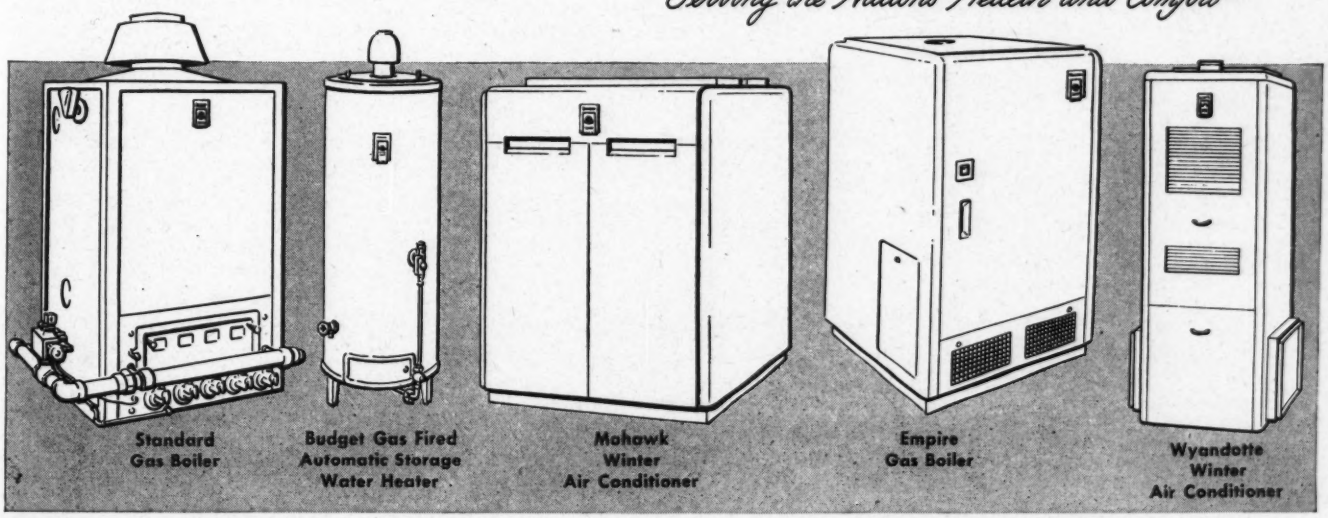
Serving the Nations' Health and Comfort



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Mohawk Winter Air Conditioner

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PEOPLE

E. T. Howard

• **E. T. Howard,** for the past 11 years sales manager for General Controls Co., Glendale, Calif., has been named general sales manager of Fraser & Johnston Co., San Francisco, it was announced recently by **W. H. Johnston,** president. Howard has traveled the nation for 20 years, calling on men in the heating and air conditioning field. He is a director of the PCGA and general chairman of its manufacturing section. He is also a director of GAMA. Howard will direct and coordinate Fraser & Johnston's accelerated national sales program.

It was announced at the same time that **Alec Easton,** former assistant sales manager for Ray Oil Burner Co., and recently in the army chemical warfare service, will serve as assistant sales manager of Fraser and Johnston.

• At a recent meeting in Wichita, Kan., stockholders of the Coleman Co., Inc., elected **Dean Olds,** chief design engineer of the company's major appliance division, a member of the board of directors. Olds joined the company in 1929 and has since been identified with its design and research program.

The following board members were re-elected: **W. C. Coleman,** president and founder of the company; **C. B. Kuhn,** secretary and controller; **Hiram W. Strong,** consulting engineer; and **A. B. Eisenhower,** vice president of the Commerce Trust Co., Kansas City, Mo.

• The Bury Compressor Co., Erie, Pa., has announced the election of **B. C. O'Brien** as president and general manager. O'Brien, a graduate in mechanical engineering of Rose Polytechnic Institute, has had wide experience in air compressor manufacture and sales. Prior to joining Bury, he was associated for a number of years with the Roots-Connersville Blower Corp. where he was vice president and sales manager.

• **Norman M. Douglass** has been appointed regional manager for the Maytag Dutch Oven gas range. The line was acquired through the Maytag Co.'s recent purchase of Globe-American Corp., manufacturer of the range. Douglass has represented the Maytag Co. in the Pittsburgh district for 15 years.

• **Bruce A. McCandless** and **Thomas S. Leitch,** both of whom entered the service in 1941 and were recently discharged as lieutenant colonels, have returned to the staff of the A.G.A. testing laboratories.

• **R. F. Brockschmidt** has been appointed division industrial engineer for the Corsicana, Texas, division of Lone Star Gas Co. Brockschmidt and his staff, composed of **E. M. St. John** and **R. B. Thompson,** industrial engineers, will be available for consultation on the use of gas in commercial and industrial plants and will discuss installation of gas air conditioning and large heating units with builders.

• **Mrs. Mary C. Dorn,** former home service director for the city gas department of St. Petersburg, Fla., has been appointed home service director of the Tampa Gas Co. She plans to direct her attention to the nation-wide program of conserving food. Mrs. Dorn will make home service calls and will edit and publish a bulletin, "Recipe of the Month".

• Sprague Meter Co. has announced the return of **Thomas J. Watt** after five years with the army ground forces. Watt joined Sprague in 1929, engaging in factory production until 1940. He rejoins the company as eastern sales representative with headquarters in Bridgeport, Conn.

• The Geo. D. Roper Corp., Rockford, Ill., has announced the addition of **N. A. Eggebeen** and **W. J. Sullivan** to its sales organization. Eggebeen, who has been selling in the gas industry for 15 years, will work with **Jack Busch,** recently appointed Midwestern division manager. He will cover northern Indiana and the state of Michigan, except Detroit. For three years with the Michigan Consolidated Gas Co., Grand Rapids, Eggebeen was identified with the "Old Stove Roundup" merchandising program.

N. A. Eggebeen

W. J. Sullivan

Sullivan will work with **Sol Weill,** Eastern division manager. He was with The Peoples Natural Gas Co. of Pittsburgh for 14 years and has recently been in the government service working as an engineer in redistribution and salvage.

• At the annual meeting of the National Association of Purchasing Agents in Chicago, **Charles F. Wilson,** supervisor of stores for Lone Star Gas Co., Dallas, was re-elected vice chairman of the public utility group of the NAPA.

• Penn Industrial Instrument Corp., Philadelphia, has announced the election of **J. T. Vollbrecht** as a director. Vollbrecht is president of the Energy Control Co., Inc., of Philadelphia and New York.

• **Col. W. F. Rockwell,** board chairman and president of Rockwell Manufacturing Co., has been elected to the board of directors of United Engineering and Foundry Co., Pittsburgh, Pa.

R. C. Cameron

• **Ralph C. Cameron** has been named assistant to the president of Ruud Manufacturing Co., Pittsburgh, it has been announced by **R. H. Lewis,** president. Cameron recently was merchandising manager of the Chrysler Airtemp Division, Dayton, Ohio. Previously he was sales manager of Kelvinator Division, Nash-Kelvinator Co., Detroit, for five years, and was with the General Electric Co., Cleveland, Ohio, for ten years as manager of the appliance and merchandising departments.

• Eight Bailey Meter Co. engineers recently released from military service have rejoined the company and have completed a refresher course at the Bailey factory in Cleveland, which brings them up to date on new equipment, procedures and policies developed while they were in the service.

These engineers are now located in the company's branch offices as follows: **J. A. Lucas,** Cincinnati; **J. W. Herrington,** Atlanta; **J. E. Zimmerman,** Detroit; **A. L. Danielsen,** Denver; **S. T. Novak,** quality engineer at Cleveland; **H. R. Jamieson,** proposition department, Cleveland; **H. C. Schink,** Boston; and **Vincent Beno,** research department, Cleveland.

W. L. Thompson, Toronto branch office manager, and **W. A. Nelson,** of the Canadian head office at Montreal, were recently discharged from the Canadian army and have returned to the Canadian subsidiary, Bailey Meter Co., Ltd.

• **L. H. Ernst** has been appointed southeastern district sales manager for Caloric Gas Stove Works. His headquarters will be in Winston-Salem, N.C. Ernst, for the past seven years, has been eastern division sales manager for American Gas Machine Co., Albert Lea, Minn.

• Borg-Warner Corp. has announced the appointment of **C. S. Davis, Jr.** as general manager and **J. W. Oswald** as sales manager of the new Norge-Heat division, which will distribute the company's domestic heating line.

J. C. Hamilton

• **J. C. Hamilton** of Shreveport, La., was named vice president in charge of rates and valuations for the Arkansas Louisiana Gas Co. at a recent meeting of the board of directors in New York. Hamilton has been head of the rate and valuation department and assistant secretary of the company for a number of years. He has been with the organization for 27 years.

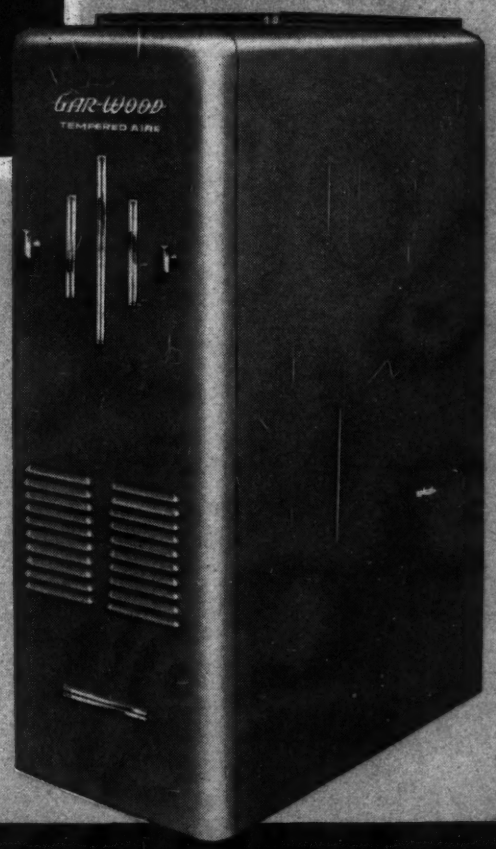
Hamilton is well known throughout the industry and has appeared before many state and national rate and valuation hearings.

THE NEW GAR-WOOD FLASH HUMIDIFIER

. . . an Outstanding Sales Feature

The Flash Humidifier is built like a miniature steam boiler with a water-filled tube extending longitudinally into the firebox. As soon as the burner starts, the water becomes heated and evaporation begins. It is far superior to the slow-heating, pan-type humidifier because it delivers an adequate amount of moisture into the house under the difficult conditions imposed by the short-firing cycles that result from the use of modern, heat-accelerated thermostats. The water level is automatically maintained at all times.

This advertisement describes new equipment which is not now available. It does not constitute an offer to sell or deliver and no suggestion is made that orders be solicited. This notice will cease to apply when ceiling prices have been established by the O.P.A.



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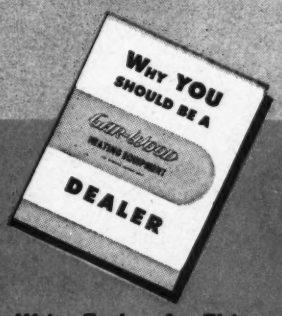

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HELP WANTED—*Male*

A progressive expanding gas company located in the Puget Sound Country of the Northwest, has openings in the Engineering Department for men with the following qualifications. All must be graduate Engineers under 45 years af age.

Distribution Engineer: With five years actual experience in Gas Distribution and Transmission Design. To assist Chief Engineer in development and expansion of transmission lines, feeders and distribution grid. Conduct Pressure Survey and work out Distribution Maintenance Schedules.

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Mechanical or Civil Engineer (recent graduate): To start as Draftsman to work on both production and distribution engineering problems. Man of cadet caliber to learn engineering department functions. Work to include field contact.

Write giving full details as to age, education, experience and availability.

Box 560, Gas, 1709 W. 8th St.
Los Angeles 14, Calif.

O. H. Fogg

• **Oscar H. Fogg,** chairman of the executive committee of Consolidated Edison Co. of New York, Inc., since 1937, has retired in accordance with the company's age limit. He will continue as a trustee of Consolidated Edison Co. Fogg entered the gas business with the United Gas Improvement Co. in Philadelphia. In 1901 he became superintendent of the Newton and Flushing Gas Co., which subsequently became a part of Consolidated Gas—now Consolidated Edison—System.

In 1919, upon his discharge from the army, Fogg became secretary-manager of the American Gas Association, returning to the Consolidated Gas Co. in 1924 as vice president. He served as A.G.A. president for two years, beginning in 1927.

• **Joe C. Darrow,** Lone Star Gas Co. manager at Brownwood, Texas, has been appointed superintendent of distribution of the Dallas division, according to **W. F. Wright,** general manager at Dallas. **L. D. Black, Jr.,** manager at Vernon, will succeed Darrow at Brownwood.

• The Estate Stove Co., Hamilton, Ohio, has announced the appointment of **S. J. Mantner** and **James N. Conway, Jr.,** as division sales managers. Mantner's headquarters will be in Chicago and Conway's will be in Boston.

Frank H. Stall

• **Frank H. Stall** has been named sales manager of Floyd and Co., Inc., Cincinnati, distributors for Servel, Inc. Stall, 34, is a native of Cincinnati. He attended the University of Cincinnati and was associated for nine years with the Cincinnati Gas and Electric Co. in various sales capacities. Prior to joining the Floyd Co., Inc., he was with the Firestone Tire and Rubber Co.

Obituaries

• **George C. Gibbons,** 57, executive vice president of the Texas Mid-Continent Oil and Gas Association, died June 13 in Dallas. During his service with Mid-Continent, Gibbons developed a large, active oil service group and worked to promote the Southwest's oil and gas conservation program.

• **Walter J. Garner,** compressor department field supervisor for Lone Star Gas Co., Dallas, died suddenly at his home in Oak Cliff, Texas, on May 17.

W. T. Bentley

• Cleveland lost one of its industrial leaders May 24 when **William T. Bentley,** president of Titan Valve & Manufacturing Co., died after four months illness. Bentley, who was 38, organized Titan Valve in 1932. He was a director of the Ferry Cap & Set Screw Co. of Cleveland as well as a director of the Kennonwood Corp., Shreveport, La., He was a member of the Gas Appliance Manufacturers Association and 1946 chairman of the thermostatic control and accessories division of GAMA.

New Gas Range Models Shown at Kalamazoo

Clyde C. Whitcomb, vice president and general sales manager of Kalamazoo Stove and Furnace Co., Kalamazoo, Mich., unveiled a "$2 million gas range" to company dealers at a recent district sales meeting, the first in four years.

Whitcomb stated that before building a single postwar stove, Kalamazoo scrapped stove production methods and put $2.5 million into rebuilding its plant, retooling, and conveyorizing along the lines of automobile mass production.

All ranges were completely redesigned, and the model which was unveiled—one of five new models—has a Uniflow top formed in a single piece from splasher back to oven doors. Some of the other features incorporated in the new models are waist-high super broiler, divided cook top, oven timer and a two-in-one condiment shaker.

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Gas Range
No. 83

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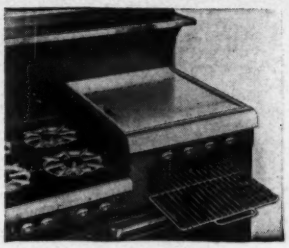
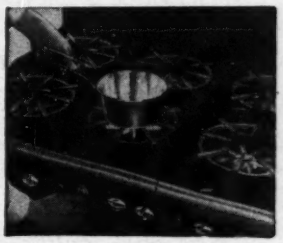
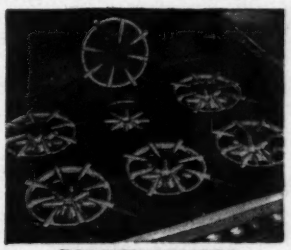
LEADER IN COMMERCIAL GAS COOKING EQUIPMENT



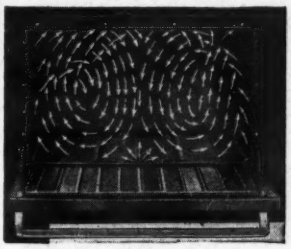
FLEXIBILITY!
Four individually controlled burners for griddle and boiler.



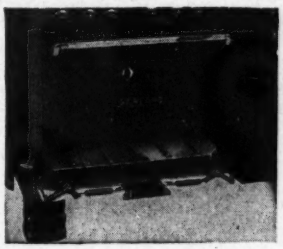
CONVENIENCE!
Automatic lighting for each of the top burners.



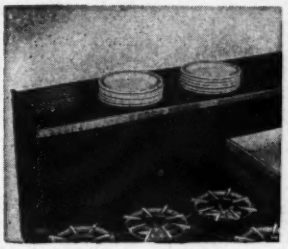
CONVENIENCE!
Removable open grate sections over each top burner.



SOUND DESIGN!
Oven design provides thorough heat circulation.



LONG LIFE!
Oven door springs located out of the high heat zone.



CONVENIENCE!
Wide high shelf for plates and serving dishes.

STRENGTH!
Strong, all-steel construction to withstand hard service.

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PIPE LINE NEWS

• The FPC has authorized **Reynosa Pipe Line Co.** to export and sell to **Gas Industrial de Monterrey, S. A.**, up to 50 MMcf of natural gas daily. The authorization is contingent upon the filing of an application with FPC for a certificate to construct about 30 miles of pipe line from the Hidalgo county, Texas, gas fields to the Mexican border.

Gas Industrial will purchase the gas at the border from Reynosa under a ten-year contract and pipe it to Monterrey for use by a limited number of industrial consumers who are subscribers to Gas Industrial's stock.

• Hearings before the Federal Power Commission were started June 25 on a consolidation of three applications by the **United Gas Pipe Line Co.**, Shreveport, La., for permission to construct additions to its pipe line system. Proceedings were held in Washington.

United, which sells and delivers natural gas to customers in Louisiana, Texas, Mississippi, Florida, and Alabama proposes the construction of pipe lines and extensions in Mississippi and Louisiana. In Mississippi, it is planned to add extensions to the existing system which will connect Baxterville and Gwinville fields; the former will require 10 miles of 12¾-in. pipe, to be built at a cost of $281,696, while the Gwinville connection will need 13½ miles of 10¾-in. pipe, costing $263,018. Further the company would increase the horsepower of its Hattiesburg compressor by 1000 hp. and would extend its Laurel loop by three miles.

In Louisiana, United plans to extend its line 16½ miles to Hayes gas field, with 12¾-in. line, and will build compressor units at the Iowa, La., station.

The third application seeks authorization for a 1-mile extension to Richton, Miss.

Gulf Refining Co. will furnish the gas to be piped from the three fields to United's present system.

• The FPC recently announced receipt of an application by **Cities Service Gas Co.**, Oklahoma City, Okla., for authority to construct and operate a 405-mile natural gas pipe line from the Kansas portion of the Hugoton field to Wichita and Kansas City. Permission also is requested to "loop" an existing line in Oklahoma and to install other additions to the company's pipe line system. Estimated cost is $23 million, and construction is scheduled to begin about April 1, 1947.

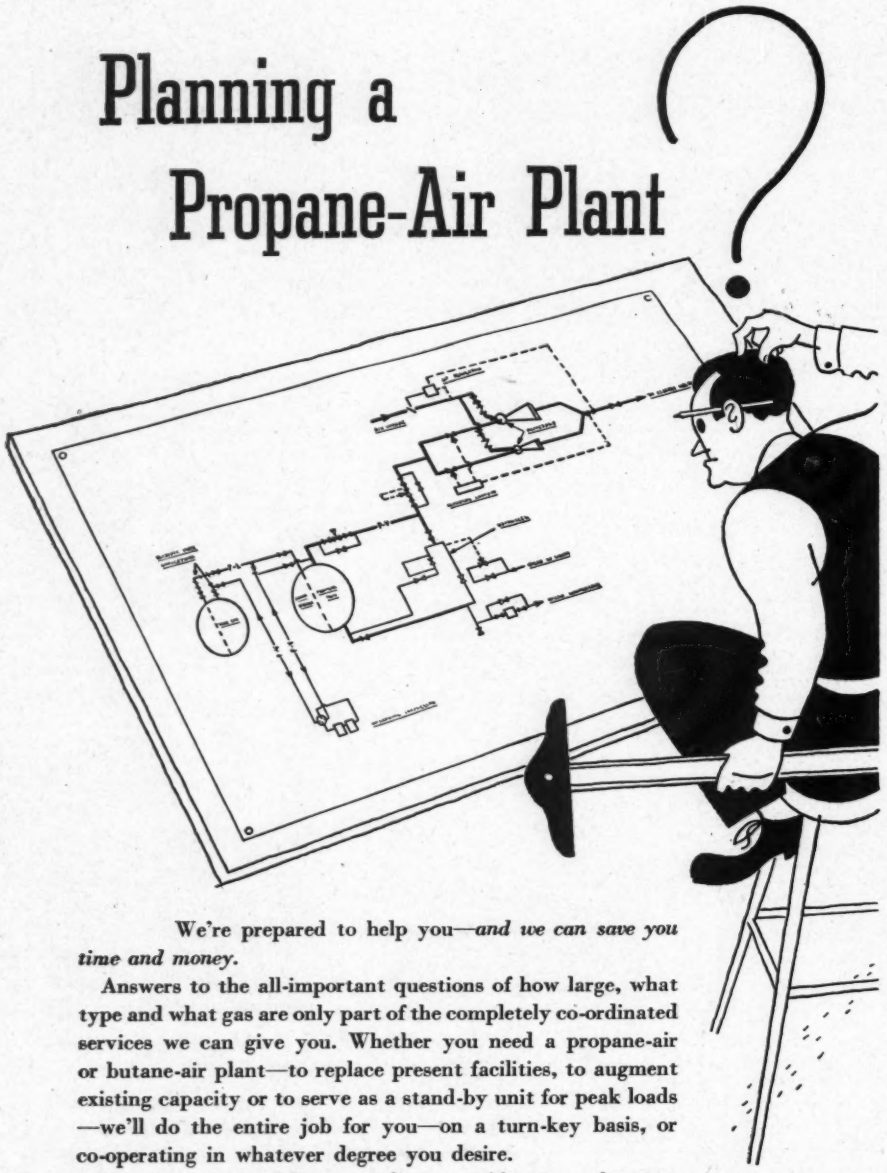
According to the application, the following proposed facilities are a part of a $30 million, four-year construction program contemplated by Cities Service: 1) A 12,000-hp compressor station and a dehydration plant in the Hugoton field. 2) About 405 miles of 26-in. pipe line from Hugoton field to Kansas City, Mo. 3) A telephone pole line from the compressor station to Texas County, Okla. 4) Approximately 33.5 miles of 16-in. loop line, paralleling an existing 16-in. line in Oklahoma. 5) A 1610-hp compressor station near Leavenworth, Kan. 6) An additional 230-hp compressor unit at the company's present Lyons, Kan. compressor station.

• The FPC has authorized **Natural Gas Pipeline Co. of America** and **Texoma Natural Gas Co.** to construct facilities to increase Natural's sales capacity by 85 MMcf daily. Natural may sell and deliver gas to distributing utilities in Illinois and Iowa to serve markets now served with mixed or manufactured gas, and **Chicago District Pipe Line Co.** has permission to make additions to its present pipe line system to receive increased gas supplies from Natural for delivery to customer companies, which distribute the gas to metropolitan Chicago. Estimated cost of the proposed construction work is about $20.5 million.

• **Panhandle Eastern Pipe Line Co.** has been authorized by FPC to make additions, including 50 miles of 18-in. trunk line and 24 miles of 26-in. loop line, costing about $6.2 million to its Texas-Michigan natural gas system. The new facilities will increase capacity by about 10 MMcf per day. Construction will begin as soon as possible.

• **Southern Natural Gas Co.** is making plans to build a pipe line from Gwinville field, Jefferson Davis county, Miss., to connect with its present line near Jackson, Miss. The new line will tap production of **Superior Oil Co. of California** properties in Gwinville field.

Planning a Propane-Air Plant



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Stacey Brothers GAS CONSTRUCTION CO.

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CURRENT READING

Desulfurization of Petroleum Hydrocarbons—R. M. Reed. "Oil and Gas Journal," March 30, 1946, pp. 219, etc. A number of organic sulfur compounds are found in petroleum and natural gas, either naturally or as a result of processing changes made in the natural material. Eleven processes for removing hydrogen sulfide from hydrocarbon materials are discussed in this article, including the old Seaboard process, Thylox, Girbotol, and others. Mercaptans may be removed by oxidation to disulfides which does not lower the total sulfur content; or by processes such as Solutizer, Mercapsol, Unisol, caustic, etc. Gray, Houdry, and Perco processes remove sulfur compounds catalytically, as does the Union Cobalt molybdate process, the last named developed especially for very high-sulfur-oil treatment.

Dealer Participation in the Gas Appliance Market—Published by the Surface Combustion Corp., Toledo, Ohio. Issued in connection with the Janitrol "Quick Get-Away Plan" being promoted by the company, the pamphlet discusses dealer-utility relationships in gas merchandising. The dealer participation plan is aimed at building consumer acceptance and increasing sales; developing the market on a basis economically "sound, self-supporting, and attractive" to dealers; controlling the quality of equipment, installation standards and trade practices; and building a strong cooperative dealer organization. Closer cooperation and a mutual understanding of gas merchandising problems is urged.

Home Service a Career—Home Service Committee, Residential Gas section, American Gas Association. This 12-page, illustrated booklet outlines the story of home service, includes a review of its activities, qualifications and advantages, and stresses the need for qualified home economics people in the gas industry. It may be used as a text to emphasize the importance of gas company home service work as a job and as a career. Copy 10 cents.

Circular C450, Bureau of Standards, Department of Commerce—Kirk H. Logan, head of the bureau's underground corrosion section. The bulletin discusses better tools and methods, cathodic protection, results of tests on a number of coatings, corrosive characteristics of certain types of soils and corrosive resistance of various metals. Available from the Government Printing Office, Washington, D.C. Price $1.25.

Magnesium for Cathodic Petroleum of Pipe Lines—R. M. Hutchison. "Petroleum Engineer," March, 1946, pp. 213, 216, 218. This article describes the application of magnesium to the Houston Natural Gas Corp.'s 43-mile 8 and 12-in. gas transmission line from Corpus Christi to Alice, Texas.

Electronic Pipe Locators, Leak Detectors—H. A. Fore. "Petroleum Engineer," March, 1946, pp. 206, etc. In the early type of pipe locator, the pipe or bable was energized by connection to a buzzer or induction coil, and traced by a pick-up loop antenna. This type, as well as an adaptation of the so-called treasure finder, is still used. The modern type of utility instrument, which is described in this article, operates entirely above ground without any connection to the pipe, except for one special application. They have been developed as the result of field use of thousands of instruments over a period of ten years and embody what appears to be the optimum choice of circuits, tubes, and principles of operation.

Measurement of Cathodic Protection Currents in Submarine Pipe Lines—W. R. Hill. "Petroleum Engineer," March, 1946, pp. 168, etc. Two electrical measurements determine the minimum protective current density on a submarine pipe line.

Effect of Hydrogen Sulfide on Coefficient for Orifice Gas Meters—F. K. Beach. "Petroleum Engineer," March, 1946, pp. 230, etc. Result of this study of high concentrations of hydrogen sulfide was that current procedure in gas metering was not affected.

Packaged Type Dehydration Plants—H. F. Dawe. "Petroleum Engineer," March, 1946, pp. 119-122. These units, which are described and illustrated, are of value to the natural gas industry for use in fields of limited production.

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There's greater progress, performance and profit in small city gas distribution systems when converted to Liquefied Petroleum Gas. Plant conversion costs are comparatively low; the service is more dependable and the operation more profitable — Liquefied Petroleum Gas plants operate automatically and assure adequate supply of uniform quality under all load conditions.

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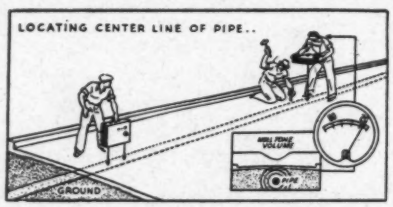

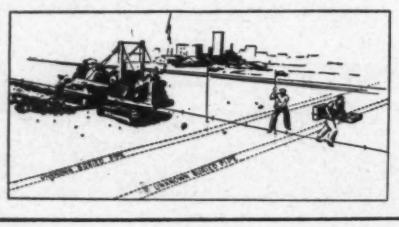

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Montana-Dakota Rate Case To be Reheard in August

A rehearing on the Federal Power Commission order of March 22, 1946, directing the Montana-Dakota Utilities Co. to establish reduced rates for common carrier transportation of natural gas has been scheduled for Aug. 13 in Minneapolis, home of the company, FPC has announced. Evidence to substantiate Montana-Dakota's claims that operating and maintenance charges have increased since May 24, 1944, when the original hearing closed, will be presented.

Pending the hearing, a stay of the order has been granted.

The order provided that the company file before June 1 a new rate schedule reflecting a demand charge of $13.20 per Mcf per year and a commodity charge of seven cents per Mcf on all gas to be transported in interstate commerce. The original proceedings stemmed from a complaint filed by the Mondakota Gas Co., Billings, Mont., that rates specified in schedules then filed by the company with FPC were excessive and discriminatory.

Colorado Interstate Opens New Compressor Station

A new 3200-hp. compressor station on the pipe line between Clayton, N.M., and Denver, and located 15 miles north of Colorado Springs, has been placed in operation by Colorado Interstate Gas Co. as part of a major expansion program. Other improvements in the program include six additional compressors at existing stations, which will account for 7800 of the 11,000 hp. to be added by the expansion program.

The new station was designed and constructed by Stearns-Roger Manufacturing Co., Denver, which also installed the compressors at the six existing stations. In addition to the compressor building there are the auxiliary building, meter building, cooled building, two well houses, and the warehouse and office.

12,000 See Kitchen Exhibit At Hartford Times Show

A Roper gas range was given away by the Hartford (Conn.) Gas Co. as a climax to its seven-day exhibit at the Hartford Times Building Show, held at the Times Radio Center late in May. Nearly 12,000 people saw the New Freedom Gas Kitchen booth which the gas company featured.

Widespread interest among the visitors in the gas company's building plans and its free information on modernizing gas kitchens was reported. In addition to the gift of the range, which was the booth's door prize, 15,000 pieces of promotional material and 2500 New Freedom Gas Kitchen match books were distributed.

Water Heater Installation Ordinance Amended

The city council of Fort Worth, Texas, recently amended a city plumbing ordinance to permit licensed gas fitters to install water heaters. The old ordinance allowed only licensed plumbers to install such heaters. The amendment was ordered on petition from Floyd L. Carmichall, general manager of the Fort Worth division, Lone Star Gas Co.

Michigan Storage Field Planned for Panhandle Gas

Consumers Power Co., Jackson, Mich., and Panhandle Eastern Pipe Line Co. have signed an agreement for a natural gas transportation and storage project designed to assure a 25-year gas supply to some 240 Michigan communities.

The contract provides for 1) conversion of the Winterfield and Cranberry Lake natural gas fields in Michigan into one of the world's largest storage areas, where gas from Texas and Oklahoma may be stored during summer months for use during the winter, 2) construction of a 150-mile 24-in. pipe line from a junction with Panhandle's pipe line near Chelsea, Mich., to the storage field, and 3) erection of a large compressor station near Chelsea to boost the gas and another compressor station at the storage field to pump the gas in and out of the storage area.

Dan E. Karn, vice president and general manager of Consumers Power Co., said the project is the culmination of years of study and negotiation, brought to a crisis by the rapid depletion of the Michigan gas fields during the war. It is the hope of the company that the new pipe line and compressor stations will be in operation early in the summer of 1947.

Bureau of Mines Bulletin Outlines Helium Uses

The Bureau of Mines, world's only commercial producer of helium, says that as much as 10 MMcf per month is now available for private enterprise. In a new publication, the bureau states that, backed by the experience of more than a quarter century of production, it can now furnish a supply of helium for medical and industrial uses and continue to meet demands of military and government agencies.

Henry P. Wheeler, Jr., petroleum engineer, author of the publication, says that the bureau's wartime expansion of facilities has resulted in the present abundance of helium and the low cost of about one cent per cu. ft.

The bulletin outlines properties and uses of helium and suggests some new applications on which research and testing are still under way.

United Gas To Continue Exports to Mexico

FPC recently authorized United Gas Pipe Line Co. to continue exportation of gas to Compania Mexicana de Gas, S.A., at the rate of 31,275 Mcf daily, the present capacity of the Mexican company's line. The facilities used by United in the exportation of this gas are also used for deliveries to the town of Roma, Texas, of about 3 MMcf annually. The FPC declared that continued exportation of gas does not impair the ability of United to render adequate service at reasonable rates to its customers in the U.S.

Ohio Fuel Rates Reduced

The FPC has declared new wholesale rate schedules which represent an estimated reduction of more than $700,000 yearly based on 1945 operations, for the Ohio Fuel Gas Co., Columbus. The rates took effect as of May 15, 1946, and are the result of proceedings started by the FPC in 1942.

Famous Facts

A new era in merchandising was inaugurated with the opening of the first Woolworth Five and Ten-Cent Store in Lancaster, Pa., on June 21, 1879.

A quarter of a century before, the introduction of hot-applied Bitumastic Enamel — first product of its kind — marked an epoch in the protection of underground and underwater metal surfaces against corrosion. Developed to shield internal surfaces of steel ships, it has given unsurpassed protection to pipe lines, and steel and iron structures in industry throughout the world.

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$200,000 in Prizes Offered for Arc Welding Papers

An opportunity to win up to $10,000 is open to members of the gas producing and manufacturing industries in the $200,000 "Design-for-Progress" contest being sponsored by the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

Papers on design, research and education, application and use of arc welding in industry will be judged to select the winners of the 452 prizes being offered.

Gas men qualify under the "processing or plastics machinery" division in the contest. All told there are 43 divisions comprising 15 broad classifications. Processing or plastics machinery division is part of the "industry machinery" classification, which includes five other divisions.

Classification and division awards will be made, as well as a main program award. Winners in each division will receive $700, $500, $250, and $150 for the first four places. Classification prizes are: first, $2500; second, $1500; third, $1000, and fourth, $800.

Recipients of awards in the division and classification competition will be eligible for the principal prizes, which are for $10,500, $7500, and $5000.

Two hundred seventeen honorable mention awards of $100 each will also be given.

Purpose of the contest is to stimulate study and research in the field of arc welding. It is the Lincoln Foundation's sixth award program and applications close June 1, 1947. Details may be obtained by writing the foundation secretary.

FPC to Rehear Michigan Consolidated Case Aug. 22

Holding that it is not a "natural gas company" within the meaning of the Natural Gas Act, the Michigan Consolidated Gas Co., Detroit, will have another opportunity to prove its point when its case comes up for rehearing before the Federal Power Commission in Washington, Aug. 22.

The company maintains that the commission erred in its findings, when on Oct. 31, 1945, it ordered the classification of the company as a natural gas company.

Gulfport, Florida, Asks St. Petersburg for Gas

The town of Gulfport, Fla., has requested the city of St. Petersburg to sell gas to Gulfport, in view of the fact that St. Petersburg mains now run into the limits of Gulfport, furnishing gas to Florida Military Academy and some residents near the academy.

City Manager Carleton F. Sharpe stated that if a formal request were received from Gulfport, the St. Petersburg city council could prepare cost estimates.

Sarasota Plant Approved

Allocation of nearly a quarter million dollars to build a gas plant in Sarasota, Fla., has been announced by the Southern Gas and Electric Corp. Sarasota has been supplied from the facilities of the Bradenton plant.

Bradenton will also be given a new plant, construction of which will start upon completion of the Sarasota project.

August 1 Deadline Set for A.G.A. Award Applications

Nominations for prospective recipients of the 1946 American Gas Association Meritorious Service award, annually bestowed upon the employee of a member company who has performed the most meritorious deed during the past year, will close Aug. 1, A.G.A. has announced.

The period during which the act under consideration must have been accomplished is from July 1, 1945, to June 30, 1946. Applications are being solicited from gas utility companies as well as manufacturers. Among the criteria to be followed in selecting the winner are conspicuous judgment, intelligence or bravery as shown in the handling of materials of manufacture, or in the production, manufacture and distribution of gas.

This year marks the 14th annual presentation of the medal, first given in 1933 by the late Walter R. Addicks, who was at the time senior vice president of the Consolidated Gas Co. of New York.

Penn-York Rate Reduction to Be Effective Immediately

The FPC recently granted Penn-York Natural Gas Corp., Buffalo, permission to withdraw its petition for rehearing of an FPC order of Feb. 16, 1946, establishing an allowable 6% rate of return and reducing the rates which Penn-York may charge its affiliate, Republic Light, Heat and Power Co.

The withdrawal of the petition allows the $53,200 yearly rate reduction to take effect immediately. The rates apply to natural gas purchased by Penn-York from New York State Natural Gas Corp. and sold in interstate commerce to Republic Light, Heat and Power Co. for resale for ultimate public consumption.

Temperature Control Price Boost Authorized by OPA

An increase of 20.8% in the manufacturer's maximum net price on automatic temperature controls was granted late in May by the OPA. This increment was to be added to the "base date maximum price," established at the Oct. 1, 1941, price level.

For those manufacturers having no base date, a 15% boost was allowed. Resellers also were permitted to increase their prices by 15%.

Watson-Standard Announces New Jetcote Series

Watson-Standard, Pittsburgh, Pa., has announced its postwar Jetcote series of black protective coatings, available in a number of types and designed to meet specific requirements. The manufacturer states that reflector, stove and heater manufacturers will find the new heat-resistant blacks suitable for service at high temperatures. They are said to make possible more attractive and durable product finishes.

FPC Requires Monthly Report

The FPC has ordered class A and B natural gas companies (those with annual gas operating revenues of more than $250,000) to file a monthly statement of operating revenues and income. The statement must be filed with FPC before the last day of each month.

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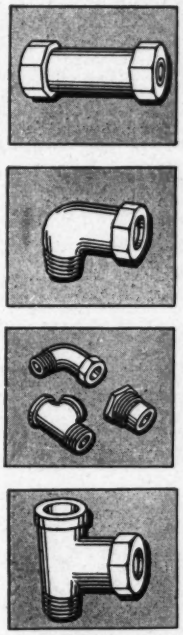

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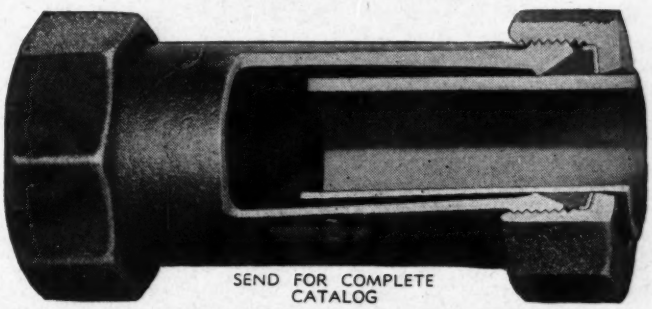

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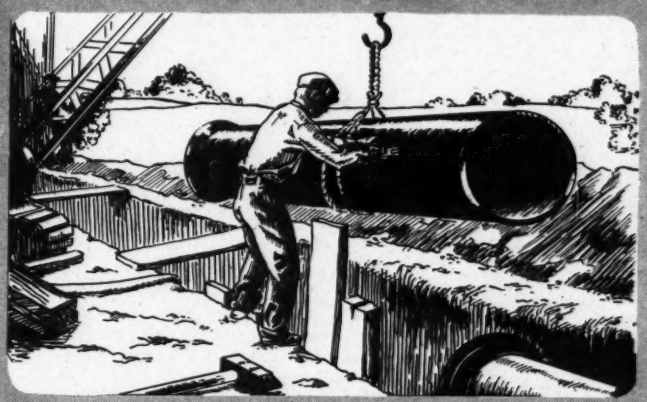

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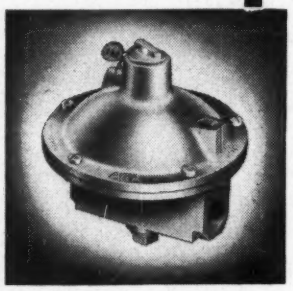

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Northern Natural to Add New Pipe Lines to System

Eleven additional cities in three states will start buying gas from the Northern Natural Gas Co., Omaha, Nebr., when additions to its pipe line system are completed, the Federal Power Commission has announced. Approval was granted last month to the corporation's request for authorization to install at a cost of $7,886,076, additions to its system, which now extends through Texas, Kansas, Nebraska, Iowa, Minnesota, and South Dakota.

The line capacity will be increased from 270 MMcf to 300 MMcf, according to FPC.

The cities to be served include Boone, Webster City, Madrid, Granger, and Grimes, Iowa; Janesville, Belle Plaine, Jordan, and Dunnell, Minn.; and Murdock and Mynard, Nebr.

Included in the facilities to be constructed are: a 450-hp gas compressor station near Otis, Kan., and a 2400-hp compressor station near Cherokee, Iowa, two 1000-hp compressor units at the Sublette, Kan., station, and two smaller stations at Oakland, Iowa, and South Sioux City, Nebr.; 156 miles of 24-in. loop line, 11½ miles of 20-in. loop line, 40 miles of 18-in. loop line, 6½ miles of 12¾-in. loop line; numerous small diameter lines, and a measuring and regulating station.

Standard Gas Equipment Brand Names Win Awards

In recognition of 116 years of representing "integrity, reliable quality, and fair pricing," the brand name "Acorn," used on stoves manufactured by the Standard Gas Equipment Corp., Baltimore, Md., was accorded a certificate by the Brand Names Research Foundation at a testimonial dinner held recently in Baltimore.

Also honored was the company's other brand name, "Vulcan," which has been used for 51 years.

The name Acorn dates back to 1830, when the first American foundry devoted to the exclusive making of stove castings was built.

Standard Gas Equipment manufactures domestic and commercial gas-fired ranges, appliances, and equipment.

The certificates are awarded periodically to brand names "which have been tested by the judgment of the American people for 50 years or more and have won and held public confidence."

Gas Plant Improvements Planned for Tallahassee

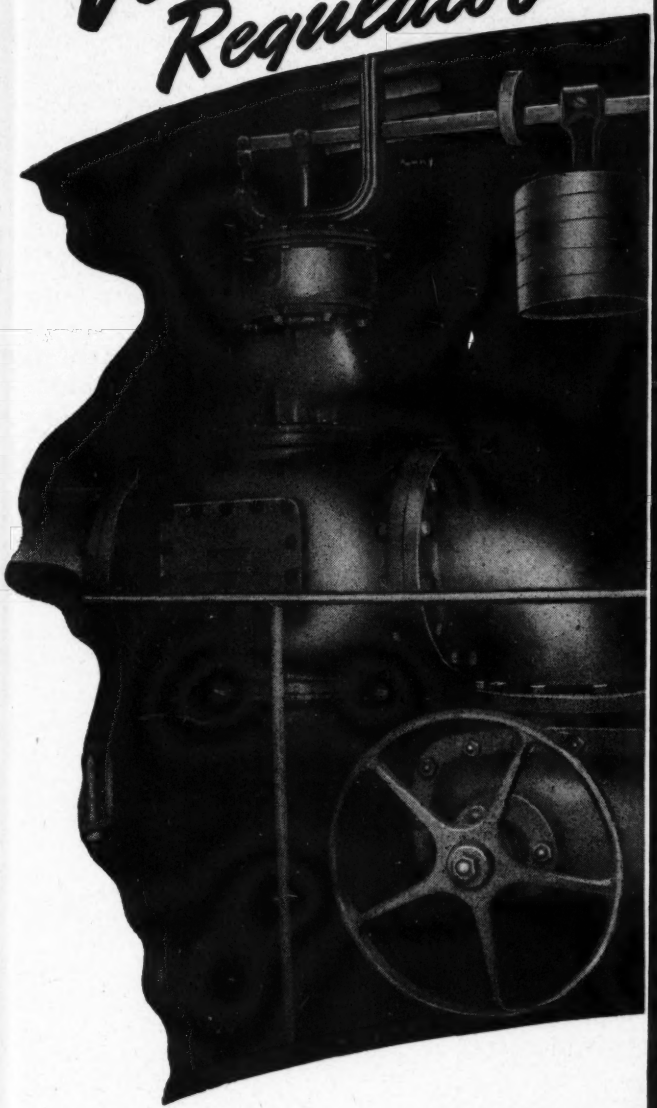
Bids have been received for the installation of a new high pressure gas holder, two new purifiers, a gas station meter, one small brick building and miscellaneous piping and minor alterations and repairs to the Tallahassee, Fla., municipal gas plant.

The bids were accepted until May 27 and were to be left open for a period of 30 days after that time.

Dunkirk Gets New Office

New office headquarters and a display room have been completed at the Dunkirk, Ind., branch of the Central Indiana Gas Co. of Muncie. Modernization of the Dunkirk office represents completion of the first step in the company's remodeling project.

Reynolds KT Series Versatile Regulator



★ Reynolds KT Series Versatile Regulator is manufactured in a range of sizes from 2″ to 12″. It will reduce pressure to inches W. C.—or pounds to pounds. This Regulator can be used where space is limited, making it impossible to use the auxiliary bowl. In addition, Reynolds builds High Pressure Line Regulators with auxiliary bowl, when complete lockup is required. Let Reynolds adapt their new Versatile Regulator to your Gas Control System.

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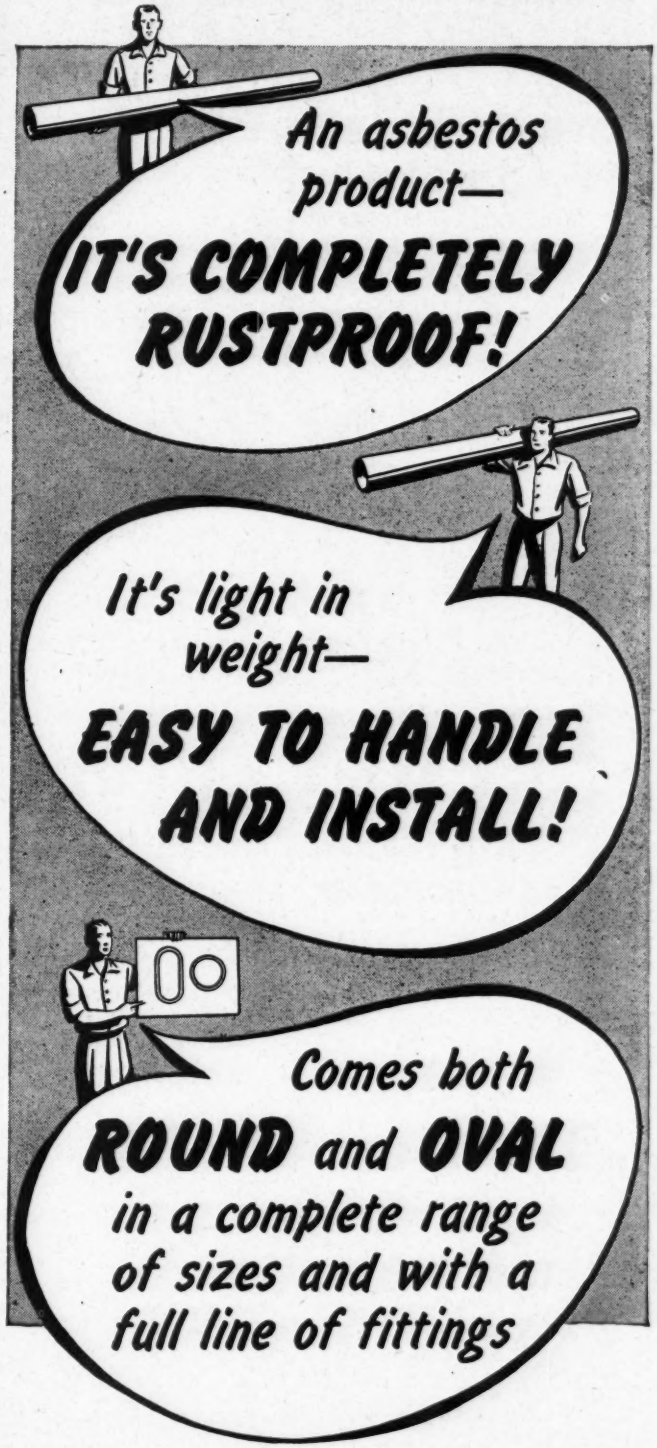
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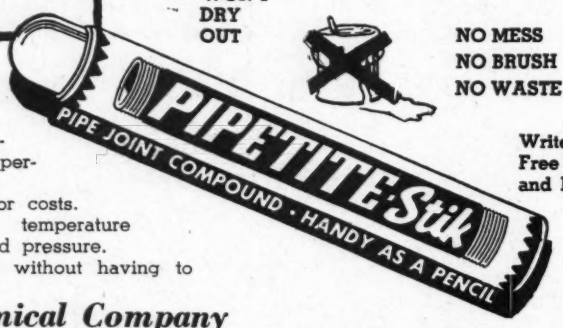

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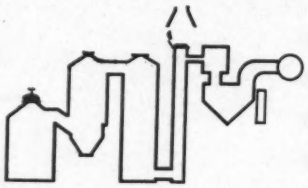

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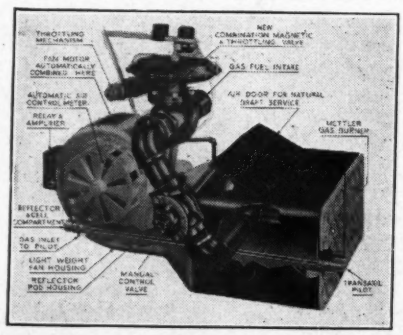

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Portland Gas & Coke Files Debt Refinancing Plan

Portland Gas & Coke Co., subsidiary of American Power & Light Co., has filed a debt refinancing plant with SEC, providing for competitive sale of $10 million new mortgage bonds and for issuance of $500,000 five-year 1¾% serial notes to banks in Portland, Ore. Proceeds are to be applied to retirement of the $8,376,000 worth of 4½ and 5% bonds, and to provide $371,000 underlying Portland Gas Co. first mortgages which are not callable prior to their 1951 maturity.

The $1.8 million balance remaining after the existing debt is taken care of will be used to finance construction needed for additional service demands on the system.

The debt refinancing plan is the first step in an overall program, the second part of which will be a request to reclassify present 6 and 7% preferred and no par common stocks into a single class of common. This second part will be filed with SEC as an amendment after completion of the debt refinancing.

Remodeling Program Begun at Fort Myers Gas Plant

Better service to gas customers will be achieved when the Fort Myers, Fla., gas plant completes the $160,000 modernization and expansion plan started in May. New storage tanks, new machinery, larger buildings, and high pressure mains are included in the program.

Three storage tanks, each with a 250 Mcf capacity, will triple the gas supply, according to company officials. High pressure mains will ease the worries of users in the outlying territories, who have been in recent years without gas when the load was more than present facilities could handle.

It is expected that revenues, which totaled $100,000 in 1945, will be doubled once construction has been completed. Schedules called for the tanks to be ready for operation in June, with the entire job to be finished in the fall.

American Radiator Plans Pacific Coast Expansion

Two new plants, one to be devoted to the making of plumbers' brass goods and fittings, the other to vitreous china plumbing fixtures, are included in plans of American Radiator & Standard Sanitary Corp. to expand its West Coast facilities. Construction of both installations is to begin shortly.

Manufacturer of gas-fired appliances and plumbing products, American-Standard has at present two plants in California — potteries at San Pablo, where plumbing fixtures are made, and a plant at Richmond which produces cast iron enameled fixtures.

Florence Stove Co. Opens New Salesrooms

The Florence Stove Co. recently opened new and larger New York salesrooms at No. 1 Park Avenue, according to an announcement by Robert H. Taylor, New York manager. The amount of floor space has been more than doubled, and the backgrounds and arrangements of displays are designed to offer suggestions to dealers for better presentation of Florence ranges and heaters.